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**External Support for the Army
in the Persian Gulf War**

John R. Brinkerhoff

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John R. Brinkerhoff

PREFACE

This document has been compiled in partial fulfillment of the IDA task entitled "Wartime Host Nation/Coalition Support," sponsored by the Director, Program Analysis and Evaluation. Much of the material in this report is extracted from reports prepared earlier for the Andrulis Research Corporation under contract with the Office, Chief Army Reserve. The original work consisted of 15 monographs in a series entitled *The United States Army Reserve in Operation Desert Storm*, written by a project team consisting of John Brinkerhoff, Theodore Silva, and John Seitz. The monographs are organized to cover specific combat support and combat service support functions in which the Army Reserve was involved. Each monograph covers all aspects of the operations in a particular function, including Active Army and National Guard units, and external support (host nation support), while emphasizing the contribution of the Army Reserve. For this report, portions of the original texts were extracted and revised to provide a report that focused on external support. Additional research was done to augment the information in the original monographs. Colonel Dan Bartlett, Commander of the ARCENT Contracting Command during the war, reviewed a draft and provided much important information about contingency contracting for external support that has been incorporated into the report. Staff officers at Headquarters, United States Central Command and Headquarters, United States Third Army also reviewed a draft of this report, and their comments were incorporated.

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SUMMARY

This paper surveys the amount and kinds of support provided to the United States Army by external sources in the Southwest Asia theater of operations during the Persian Gulf War of 1990–1991. External support includes host nation support that is made available through official agreements, money or in-kind donations, and goods and services obtained by contracting. The information provided in this paper comes from a review of after-action reports and from extensive discussions with participants in the war.

External support was critical to the success of the U.S. Army in the Persian Gulf War of 1990–1991. Although there was a massive build-up of military support units in the theater of operations, these units alone were insufficient to provide the supplies and services needed to sustain the operations of the combat forces. About half of the aggregate amounts of supplies and services came from external sources. In some functional areas, such as transportation and fuel supply, external support was critical to the success of the U.S. Army. In other areas, such as finance and personnel management, external support was merely helpful. For most functional areas, external support was an important source of goods and services that augmented the support available through military channels. The Army could not have done what it did during this war without the generous assistance of the Kingdom of Saudi Arabia and other Coalition Allies and without great reliance on the infrastructure and commerce of Saudi Arabia and Southwest Asia. Table S-1 summarizes our conclusions about the relative importance of external support to Army operations during the war.

With two exceptions—fuel and construction—few preparations had been made ahead of time by CENTCOM or ARCENT to obtain host nation or external support in the theater. After the war started, arrangements to obtain external support and award contracts for goods and services had to be hastily improvised. Thanks to a 6-month period allowed for a build-up of military forces, these arrangements succeeded. We were lucky. In future theater wars, it is essential that logistical preparation of the battlefield include consideration of the availability of external support and plans and preparations to use locally available goods and services to complement support provided by military units.

Table S-1. Relative Dependence on External Support by Function

Functions for which External Support was **CRITICAL**

Water Supply
Tentage Supply
Petroleum Supply
Ammunition Supply
Repair Parts Supply
Port Operations
Railway Operations
Heavy Equipment Transporters
Local and Short Haul Transportation
Line Haul Transportation
Construction
Barrier Materials Supply
Construction Materials Supply
Enemy Prisoner of War Operations
Wheeled Vehicle Supply
Minor Equipment Items
Maintenance

Functions for which External Support was **USEFUL**

Food Supply
Sundries Supply
Field Services
Medical Services
Medical Supply

Functions for which External Support was **TRIVIAL**

Air Delivery Operations
Individual Clothing and Equipment Supply
Combat Vehicle Supply
Personnel Service Support
 Personnel Operations
 Finance
 Postal Service
 Mortuary and Casualty Affairs
 Personnel Replacement System
 Chaplains
 Judge Advocate General's Corps
 Public Affairs
 Bands

A. INTRODUCTION

The fundamental law of logistics is that supplies and services for an armed force can be provided in only three ways:¹

- Take them along.
- Have them sent.
- Obtain them from the countryside.

All of these methods have been used in warfare. The first method is still used, and because of the progression from human bearers to animals to carts and motor vehicles and airplanes, the troops can take more support with them than before. The second method is still used to resupply the troops and perform essential services, and elaborate systems of support units have been established to send support to the combat units. Despite these improvements, however, the troops cannot carry enough supplies and the military support forces cannot send enough supplies and services to meet all of the demands of modern warfare. It is still necessary to obtain some supplies and services from the countryside—from external sources.

1. External Support

The purpose of this paper is to identify the amounts and kinds of external support provided to the United States Army in Southwest Asia during the Persian Gulf War over and above the supplies and services provided by military units operating in the Army's own support system. Host nation support, contractor support, and donations of equipment and funds were essential to the provision of adequate supplies, services, and specialized support and the success of the combat operations.

The term "external support" has been adopted because the usual term, "host nation support" (HNS), is too narrow to cover the full range of support actually provided. The official DoD definition of HNS is as follows:

Civil and/or military assistance rendered by a nation to foreign forces within its territory during peacetime, times of crisis/emergencies, or war based upon agreements mutually concluded between nations.²

¹ Roger Mickleson, "Logistics and Technology in Military Combat," presented at the 20th Annual General Working Meeting, The Military Conflict Institute, December 1996.

² "Department of Defense Dictionary of Military and Associated Terms," Joint Pub 1-02, 1 December 1989.

The official definition of HNS covers only that support provided by the nation in which the forces are operating and for which there are formal agreements. This report will show, however, that this narrow usage would exclude much, if not most, of the support actually provided to the U.S. Army from the countryside during the Persian Gulf War.

All military forces provide some of their own support. Every military unit (ship, squadron, battalion, company) has some organic support capability built into its unit design. Other military units are designed and provided specifically to give support of various kinds to other units. Despite the support that is already built into the military force structure, armies, navies, and air forces have always relied on external support because of the implacable nature of logistics, as stated in its fundamental law.

Table 1 lists all possible sources of support for the United States Armed Forces. All of these sources except organic support in military units and military support units are considered external support from the countryside—host nation support in its broadest sense.

Table 1. Sources of Support for the U.S. Military Services

<u>Army Support System</u>
Organic support capability in military units
Military support units
<u>U.S. Government Departments and Agencies</u>
Department of Defense
Civilian employees
Defense agencies
Other departments and agencies
<u>Contractors Paid by the United States</u>
U.S. contractors
Host nation contractors
Third country contractors
<u>Allies or Coalition Partners</u>
Allied armed forces
Allied government agencies
Contractors paid by allied governments
<u>International Relief Organizations</u>
<u>The Host Nation or Nations</u>
Direct in-kind supplies or services
Contractors paid by the host nation
Access and use of host nation infrastructure

2. Sources of External Support

All of the various sources of support listed in Table 1 were used in the Persian Gulf War. Host nation support meeting the criteria of the official definition was important but constituted only part of the total amount of support received. Although the Kingdom of Saudi Arabia (the host nation) threw open its land, its infrastructure, and its resources to the U.S. and was generous with both money and its natural and human resources, little of this was provided in accordance with formal agreements reached before the war. Some of the other major sources of external support were as follows:

- Department of Defense and Military Service support organizations, such as the Defense Logistics Agency, Army Materiel Command, and Corps of Engineers, sent civilian employees to the theater to augment military units and provide special capabilities.
- Other government agencies, such as the Federal Aviation Administration and Department of Agriculture, sent employees to the theater.
- The U.S. Government contracted with U.S. construction companies and shipping companies, the Saudi Arabian Railways, Saudi Arabian trucking firms, and European catering companies to provide supplies and services.
- Coalition partners provided support for U.S. forces (and received support from U.S. forces). The Egyptian Government sent an entire battalion of heavy equipment transporters to carry U.S. tanks. The Government of Germany donated trucks and other equipment.
- The Government of Japan (GOJ) provided funds to buy equipment and sent it to the theater.

All of these additional sources were not only helpful but in aggregate essential to support the U.S. and Coalition forces.

3. Support Operations in Southwest Asia

Support operations in Southwest Asia during the Persian Gulf War were affected by three major considerations:

- *The Tactical Situation.* The tactical situation was one of uncertainty. During the early weeks of the build-up, Iraq had the capability to attack at any time, and an Iraqi attack was considered quite possible. Thus, the initial emphasis had to be on building combat power even at the cost of deferring the introduction of some valuable support capability.
- *Personalities and Preferences of Senior Commanders.* The deferral of support was the preference of General Norman Schwarzkopf and other

senior Army military commanders, all of whom were combat arms officers. The senior logistics officers of the Army were unable to persuade the combat leaders that support was necessary to allow the combat units to fight. As a result, many support units and headquarters were introduced late according to doctrine.

- *Existing Infrastructure and Locally Available Support.* The nature of commerce and the infrastructure in Saudi Arabia made it possible to rely on local support to compensate for the lack of military support units, particularly in the initial weeks of the build-up of U.S. forces in the theater.

The goal of force designers is a theater army that has at all times the proper balance of combat and support units so that maximum combat power can be delivered continuously. In a balanced force, there is no excess of support units that do not contribute to combat power, and there is no excess of combat units that cannot be supported. This goal was not achieved in the Persian Gulf War.

From August 1990 until January 1991, despite heroic measures by the Army's logisticians, there was insufficient support in Southwest Asia to meet the needs of the combat forces assembled there. The adverse imbalance was particularly acute in September and October 1990 after most of the available active support units had been deployed but before a new wave of Reserve component (RC) support units was mobilized. The support balance improved in November and December, and by mid-January 1991 there were sufficient support units in Southwest Asia to provide minimally for the combat organizations of ARCENT. RC support units were still deploying during February to bring the support strength up to the necessary levels for the anticipated offensive action. The Army's support units worked steadily to emplace the massive logistical (log) bases that were used to support the combat forces, then support the massive westward movement of the two corps to attack positions, and then follow the combat units into Iraq with supplies. They were stressed to capacity in doing this. Fortunately, the war ended before the support forces were stressed beyond their capacity.

Support operations in the Persian Gulf War occurred in four phases: Initial Defense; Build-up, Attack, and Redeployment. The major goals and events of each phase are summarized below.

The Initial Defense Phase from 7 August to 9 November 1990 focused on the reception and inland movement of the XVIII Airborne Corps and its five major combat organizations: the 82nd Airborne Division, 101st Air Assault Division; 3rd Armored Cavalry Regiment; 24th Infantry Division (Mechanized); and the 1st Cavalry Division.

The key to success during this phase was rapid mobilization of host nation support. The priority given to getting combat units into the theater in order to defend Saudi Arabia from possible Iraqi attack meant that the units needed to provide support, and the headquarters needed to coordinate the provision of that support, were not available when needed. Fortunately, a lot of trucks, food, water, petroleum, and other resources were available in the country, along with the contractors and government agencies that could provide them in usable form.

During the initial defense phase, existing ports at Dammam, Al Jubayl, and lesser locations were expanded and operated to permit the unloading of units and supplies without undue delay. Log bases were established in Dhahran and at the ports of Dammam and Al Jubayl to store theater stocks and theater reserve stocks for future operations. Processes were created and resources allocated to facilitate receiving incoming units at the sea- and airports, uniting the units with their equipment at the seaports, and moving the units and equipment onward to inland assembly areas and billeting areas. Log bases Pulaski and Bastogne were established in the Eastern Province to serve as the sources of supplies and services for the XVIII Airborne Corps. A network of main supply routes with traffic regulation, movement control, and convoy support centers was created to facilitate long-haul truck transportation. Ammunition was moved away from the port areas to theater stockage areas inland. An adequate supply of petroleum products from local and regional refineries was arranged, and tactical petroleum terminals were constructed along the MSRs to supply a network of refueling points for vehicles and helicopters. The log bases, tactical petroleum terminals, and ammunition stockage areas were positioned to the North in a daring move to provide a logistical posture that would support offensive as well as defensive actions. This meant that some logistical facilities were out ahead of the combat forces at some times during this phase.

The Build-Up phase from 18 November 1990 to 16 January 1991 comprised two major logistical operations. The first was the reception and onward movement to inland areas of the VII Corps and four more major combat organizations: 1st Armored Division; 3rd Armored Division; 2nd Armored Cavalry Regiment; and the 1st Infantry Division. The second operation was the build-up stock of supplies in the forward areas to support the planned attack of the two corps northward into Iraq.

The key to success in this stage was the creation of two massive log bases—Alpha and Bravo—along the Tapline Road further to the west. This not only assured good logistical support for a defense but also provided jumping off points for offensive action.

During the build-up phase, Log Base Alpha at Hafr Al Batin, where the road from Riyadh meets the Tapline Road, was built to serve as the principal base for the entire VII Corps in its initial assembly areas, and it was stocked to serve as a support base for the westward movement to take place in the Attack Phase. Log Base Bravo was created near King Khalid Military City (KKMC) as the largest single logistics base with large stores of theater stocks and significant capability for general support (GS) maintenance, as well as the largest ammunition storage facility ever built. Log Base Delta was created south of KKMC along the main supply route (MSR) to Riyadh to provide backup stocks of supplies, including ammunition. The network of MSRs was refined and expanded to include the new log bases and to provide a potential jumping off point for westward movement. The condition of the roads was improved as well. Additional theater stockage areas for ammunition were created in the vicinity of KKMC and Riyadh. Tactical Petroleum terminals were established at Log Bases Alpha and Bravo and at Saudi South. During this phase, particularly in December 1990 and January 1991, a large number of support units arrived in the theater, along with the battalion headquarters needed to command and control them. By the end of this phase, the logistical support for ARCENT was about in balance with its combat forces, and the support structure crystallized just in time to support the forthcoming attack.

The Attack Phase from 17 January to 28 February 1991 supported the ground war. Logistical forces first positioned themselves to support the attack by moving themselves and large amounts of supplies westward into the rear areas behind the attack positions of the two corps. Then, when the attack began, the support units moved northward behind the forward combat elements.

By mid-February Log Bases Charlie and Echo had been built and stocked, and the support units were ready to support the ground war. Log Base Echo was established along the Tapline Road west of Hafr Al Batin to support VII Corps. Units of 2nd COSCOM converged on Log Base Echo, which became the site of a tactical petroleum terminal, ammunition supply point, a major maintenance facility, and major stocks of supplies, as well as medical and other support activities. Log Base Charlie was established even farther to the west near Rafha to support XVIII Airborne Corps. Units of 1st COSCOM converged on this log base to provide another tactical petroleum terminal, ammunition supply point, maintenance facility, stocks of supplies, and other support activities.

The concept for support of the ground war was for the combat units to take with them in their trains sufficient supplies of fuel, ammunition, food, and water for the first

several days of combat. Immediately after the division trains, convoys of vehicles from the corps support groups would follow, bringing more fuel, ammo, food, water, and other supplies. Maintenance units and medical units would also move in the convoys to provide support as far forward as possible.

As soon as the attack helicopters and fighters of the Coalition Air Forces attacked Iraq, the units of the two COSCOMs and many of the units of the 22nd SUPCOM started their engines, mounted their vehicles, and began the wildest, largest, logistical convoy of all time. COSCOM units followed the divisions as they moved hundreds of miles into attack positions just south of the Iraqi border. SUPCOM units moved supplies, vans, and tools to two new log bases that were to provide the key support for the ground war.

As the divisions advanced into Iraq, new log bases were to be built about 40 to 50 miles inside Iraq to provide the wherewithal to sustain combat. The forward bases would be established and stocked initially by the two COSCOMs, and 22nd SUPCOM convoys would follow to restock them. The cycle would continue until the mission was accomplished. As the fighting forces moved farther from Log Bases Charlie and Echo, the new forward log bases would become more and more important.

The logistical support plan worked. There were enough supplies in the forward area to support the combat units, and more supplies were on the way when the war ended. The support troops advanced just behind the combat units and in a few cases inadvertently got out in front of them.

The build-up of logistical support during the Build-Up Phase and, particularly, during the Attack Phase was made possible by meticulous deliberate planning that was rehearsed, modified, and rehearsed again until it was right.

The Redeployment Phase from 1 March 1991 until mid-1992 focused on returning to the continental United States (CONUS) and Germany the troops, equipment, and supplies sent to Southwest Asia during the earlier phases. The sudden end of the ground war with the cease fire of 28 February 1991 changed the focus of the logistical support effort. Instead of pushing supplies forward, the main concern became getting the equipment and unused supplies back in usable condition. Instead of following a deliberate plan, the logisticians found themselves improvising to cope with a delightful but unexpected turn of events. From 1 March to about 31 December 1991 the emphasis was on redeployment.

The general approach for redeployment was simply to reverse the process of the build-up and do the withdrawal in reverse. As the combat units pulled back, the support

units tore down the log bases one by one, emptying them of their supplies and taking the supplies either directly to the port or to the next set of log bases back down the line. The supplies moved onto the ports were processed and loaded onto ships and returned to depots in CONUS or Germany.

The build-up process was inefficient, but the driving concern was being ready to fight. The tear-down process was accomplished in an orderly manner to save as much of the equipment and unused supplies as was possible. The combat forces and the leadership of the Army were entirely in sympathy with the build-up, but only the support units it turned out were concerned much about doing the tear-down in an orderly manner. In their haste to get home, many combat units simply discarded equipment and supplies, leaving the dirty work of cleaning up to the support units. As a result, support units were the last to leave the theater.

B. PREPARATION FOR EXTERNAL SUPPORT

External Support was of critical importance for the United States Armed Forces in the Persian Gulf War. Without external support, the war could not have been fought as soon as it was or as well as it was. If the United States had landed in a barren country with no infrastructure, no ports, no airfields, and no trucks, oil, or usable water, it would have taken a long time for military forces and civilian contractors to prepare the theater to sustain military operations.

With few exceptions, however, it appears that few explicit preparations were made for acquiring and using external support (including HNS) to support U.S. military forces and operations in Southwest Asia.³ Although the United States had played a major role in developing the Saudi Arabian infrastructure and supporting the Saudi Arabian military forces with foreign military sales and training, we had little knowledge of what was available there to support military operations by U.S. forces. CENTCOM had overall responsibility for planning contingency operations in Southwest Asia, but no market survey had been done to determine what goods and services could be made

³ Headquarters CENTCOM and Headquarters Third Army reviewed a draft of this paper and provided no information about pre-war planning and preparation for host nation support or external support for an operation in Southwest Asia. This is indicative, but not conclusive, that little thought was given to external support in pre-war planning.

available there by means of contingency contracting. This made it hard initially to obtain adequate support for reasonable prices.⁴

Two areas for which substantial preparations had been made for external support were construction and petroleum product supply.

1. Engineering and Construction

Construction work to support the war began in Saudi Arabia 40 years before the war started. In 1952, the U.S. Corps of Engineers began construction of a U.S. Air Force Base in Dhahran which was later turned over to the Saudi Government. In 1972, the Saudi Government asked the Corps of Engineers to manage the construction of a military infrastructure designed to provide for the security of Saudi Arabia. Under the supervision of the Corps, contractors were brought on board to design and construct ports, airfields, roads, and three massive military cities to house and provide support facilities for large military forces. King Faisal Military City was located in the South to face Yemen; King Abdul Aziz Military City was located in the Northwest to face a threat from Syria and Jordan; and King Khalid Military City was located in the Northeast to face a threat from Iraq and Iran. Naval and Air Force facilities were also expanded and improved.⁵

The Saudi Government spent at least \$14 billion to prepare facilities against the possibility of an attack from outside. This was fortunate, for when the U.S. and other Coalition forces arrived in Saudi Arabia, they found excellent port facilities, a reasonably good highway network, a telecommunications system, and a substantial number of buildings and other facilities to house the troops and administer the units. The pre-war construction not only saved time and money, but it allowed the U.S. to reduce its engineer force structure in the theater below what otherwise would have been required. Forty years of preparation paid off in Operation Desert Storm not only in terms of what was built but also in terms of the trust that was built up between the Army and the Saudi Arabian Government.⁶

⁴ Colonel C. Daniel Bartlett, 'External Support for the Army in the Persian Gulf War: A Contingency Contracting Perspective,' draft manuscript, 7 September 1991.

⁵ Lieutenant General Henry J. Hatch, Chief of Engineers, address at Lehigh University, 6 December 1991.

⁶ Ibid.

2. Fuel Supply

The Defense Fuel Supply Center (DFSC) made advance preparations to obtain petroleum and petroleum products from refineries in Saudi Arabia and elsewhere in the Persian Gulf in case of need. DFSC maintained a regional office in Saudi Arabia and kept in contact with possible sources of fuel in the Persian Gulf. The U.S. Navy had a long-standing open purchase order for fuel for the fleet in the theater, and this came in handy during the early days of the war before new contracts could be approved by the authorities in Washington, DC. In addition, the Army had formed special petroleum liaison detachments in the Army Reserve whose sole purpose was to arrange for petroleum products from local sources in the event of a major regional contingency.

Despite these two most useful exceptions, the general impression is that little real planning and preparation had been done for external support in Saudi Arabia. This lack resulted in part because the previous planning scenario had anticipated a war with Iran based in Iran, and in part because planners had failed to appreciate the extent to which the U.S. would require extensive external support in order to operate in Southwest Asia with major forces.

C. CLASSES OF SUPPLY

Logistics and administration provides supplies and services. This section of the report describes the contribution of external support to each of the classes of supply. The following section, D, describes the contribution of external support to each of the service functions.

External support was of critical importance in some classes of supply but not in others. The balance of this section discusses each of the nine classes of supply and the extent to which external support was a factor. For each class, a subjective rating is assigned to indicate the extent to which external support was important for that category. In categories for which external support was a major source of supplies, it is considered to have been *critical* to the success of the operation. In categories for which external support was a substantial contributor but was not absolutely necessary, it is considered to have been *useful* to the success of the operation. In categories for which external support provided either small amounts of supplies or no supplies at all, it is considered to have been *trivial* to the success of the operation.

1. Class I & Class VI Supplies

External support was useful for food, useful for sundries, and critical for water

Class I consists of food and water, both for drinking and industrial purposes (e.g., washing vehicles). Class VI consists of personal items (sundries) for the troops. The Army was executive agent for rations and water for all land-based forces in the theater.

Food. Most of the food eaten by the troops in Southwest Asia was provided by the Army, but external support played a useful and important role in providing fresh food for the troops and all of the food for the enemy prisoners of war.

About a third of the total meals consumed in the theater were meals-ready-to-eat (MREs). Just over a half of the total meals were other kinds of preprocessed rations, including B-rations (bulk food to be prepared by unit or base cooks), T-rations (individual trays that do not need food service personnel), or meals-ordered-ready-to-eat (MOREs), consisting of individual portions of commercial food items packaged for individual or group feeding. The Army used all of its limited stocks of T-rations during the war and relied primarily on B-rations and MOREs. In preparation for the ground war, over 68 million preprocessed meals were stocked at log bases Pulaski, Bastogne, Alpha, Bravo, Charlie, and Echo, and over a million gallons of bottled water (most of it in 1-liter bottles) were stocked initially at Log Bases Alpha and Bravo and then moved to Log Bases Charlie and Echo to support the ground war.⁷

The remaining 14 percent of the total meals consumed in the war were Class A rations (fresh foods) supplied either by local caterers paid by the Saudi Government or issued from U.S. stocks. Catering firms provided, prepared, and often served the food to military personnel and civilian employees in the rear areas of Riyadh and Dhahran. The Government of Saudi Arabia paid for most of this fresh food.⁸

"Extensive use of host nation reefers was required" to provide for cold storage of perishables and for cooling of water and other beverages. Without the local assets, there would have been a critical shortage in the theater of refrigeration and ice-making

⁷ Important sources of data on support operations are Third Army Briefing at the Army Logistics Policy Council, 6-7 June 1991, and DA ODCSLOG Operation Desert Shield and Desert Storm Sustainment Brochure, undated, probably early 1991.

⁸ General William G. Pagonis describes in his book (*Moving Mountains*, Harvard Business School Press, Boston, MA, 1992, Chapter 5) how he went about setting up HNS and how a Saudi caterer was engaged to provide fresh food for the troops.

capacity.⁹ The Army leased 1,000 refrigerated vans to store food and cool water and contracted for an ice plant to provide ice to forward deployed units.¹⁰

While the financial contribution of the Saudi Arabian Government for food was substantial, most of the troops ate Army rations most of the time. The Army could have fed all of its troops, but the provision of fresh food from external sources provided variety and was an important factor in sustaining morale during the build-up period. Overall, external support was useful and important, but not critical in the same sense as this term is applied to water and fuel.¹¹

Sundries. The Army provided sundry packs with soap, shaving materials, writing paper, lip balm, sun screen, sunglasses, and feminine hygiene items with its ration issues. The Army and Air Force Exchange System (AAFES) opened exchanges in log bases and housing areas where the troops could purchase other sundry items. Finance offices paid the troops partially in cash if they wanted it and exchanged U.S. money for Saudi money to be spent in the local markets for souvenirs or other personal items.

The supply of feminine hygiene products was complicated by the fact that the women did not want to use the items supplies in the sundry packs and AAFES could not supply commercial items fast enough to meet the demand. The problem was solved by a female contracting officer who purchased all of the commercial items in the theater and then arranged for them to be distributed to units in the field. Toilet paper was another item that was purchased in quantity from the local economy.¹²

Water. Almost all of the water used by American forces in Southwest Asia was procured locally from Saudi Arabian desalinization plants, desert wells, or locally produced bottled water.¹³

The concept for water supply in support of Operations Desert Shield and Desert Storm was to take maximum advantage of local water resources, use local water that met standards for potable water, purify local water where necessary, and supplement with bottled water for troop consumption. Planning for water supply and assembling the

⁹ Headquarters, 22nd Support Command, "Field Services After Action Report," 6 April 1991.

¹⁰ Bartlett, op. cit.

¹¹ Colonel Bartlett and some others consider external support to have been critical for all Class I supplies.

¹² Bartlett, op. cit.

¹³ The principal source for this section is John R. Brinkerhoff and Theodore S. Silva, "General Support Water Supply," in *United States Army Reserve in Operation Desert Storm: Combat Service Support*, Andrulis Research Corporation, 1996.

resources to provide water was a high priority for logistics planners because it was clear at the outset that water would be important for operations in Southwest Asia.

Although a desert, the Northern Province of Saudi Arabia had considerable water resources to support its own population and activities. There was considerable underground water, and the Saudi Government had drilled wells to provide water for the nomads as they moved across the desert. In addition, the Government of Saudi Arabia operated large salt-water distillation plants on the East Coast with a distribution system adequate to meet the needs of the local population and the oil industry. The existing water system, however, was much too small to purify and distribute enough water to support the United States and other Coalition military forces as they massed in the northeastern part of Saudi Arabia against the Iraqis.

This was a job for the general support (GS) water supply units of the Army. The Army has two water supply systems. The direct support (DS) system is integrated into the supply and services companies of the division and corps support commands and general supply companies at echelons above corps (EAC). The DS system is adequate to purify, distribute, and supply water obtained from streams and lakes in moist climates. The GS water supply system provides specialized water supply units for operations in arid climates, such as Southwest Asia. GS water supply units used reverse osmosis water purification units (ROWPUs) to filter water and purify it for drinking, large fabric bags to transport water on 20-ton trailers, and pipes and pumps to distribute water to the tank trucks of using units. In Southwest Asia, the GS water supply units obtained water from wells and desalinization plants and moved it by truck to water supply points, where it was purified and issued to water trucks from using units.

Additional water tanker assets were obtained to supplement the distribution equipment in the hands of U.S. Army units. Although the Army had turned to the new fabric bags to transport water on trailers, some 230 of the older 5,000-gallon hardwall tanker trucks were produced in the United States expressly for use in Desert Storm. The Japanese Government donated 60 water tankers with 25,000-liter (6,600-gallon) capacity and 5 tankers with 22,000-liter (5,800-gallon) capacity. The Japanese water tankers were used extensively in the theater for hauling bulk water for showers, wash racks, and similar uses.¹⁴

¹⁴ Interview, Captain Chris Pegues, Third U.S. Army Water Section, 6 October 1992.

During the initial defensive phase when the XVIII Airborne Corps had arrived and was deployed in defensive positions inland from the coast, the U.S. troops in the theater drank locally contracted bottled water or bulk water from local desalinization plants. The water supply point at Log Base Bastogne was established initially as a "dry" point, and potable water was trucked in from other sources, primarily the Saudi Government reverse osmosis plant at King Fahd International Airport. Water was trucked in by medium truck companies using 5,000-gallon bags on their flatbed trailers and by 5,000-gallon tank trailers certified for potable water. Commercial water tankers driven by third country drivers were used to supplement the Army vehicles. In November 1990, an existing well south of Log Base Bastogne was contracted for as a raw water source, and the GS water point there went "wet." A pipeline was constructed to carry raw water a kilometer from the wellhead to the ROWPU at Bastogne.¹⁵

Over 115 water transport vehicles were provided by Saudi Arabia under a host nation support agreement and issued to units lacking an organic water hauling capability. The vehicles were small Mercedes tank trucks that had been used previously to haul potable water (by Saudi standards) to remote locations in support of the Bedouin sheep herders. The condition of these trucks when received ranged from good to poor, and they were reconditioned before being issued to the units. These Saudi vehicles helped ease a theater-wide shortage of potable water hauling capability, reduced the hauling workload for the GS water supply units, and gave some small unit commanders a necessary degree of self-support capability.

Despite the commitment of two-thirds of the GS water supply units in the entire force structure, the Army had inadequate water supply capability in the theater. Most of the bulk potable water distributed from Army water points was purified by the Saudi plants. Much of the water had to be hauled in civilian trucks because there were too few Army tank trucks and trailers to do the entire job. Because of the success of the water supply system, the troops had no cause to exercise water discipline or conserve water, so they consumed a lot of that precious substance. The Army's ability to deliver water would have been insufficient, however, to support a longer war.

Without extensive local resources, the Army would not have been able to supply enough water to support operations in Saudi Arabia. Doing this with Army units alone

¹⁵ Major Michael Trombetta, *Bulk Water Operations in Operation Desert Storm*, 8 February 1994. Major Trombetta was executive officer of the 370th QM Battalion during the war.

would have required construction of several desalinization plants, use of many more ROWPUs, and about 20 additional medium truck companies with 5,000-gallon trailers.

2. Class II Supplies

External support was trivial for supply of individual clothing and equipment but critical for supply of tentage

Almost all Class II items were provided by the DoD supply system. Items of particular interest in Class II were tentage, cots, military uniforms, tools, and chemical protective over garments. Over 4 million desert uniform items were issued, including the desert battle dress uniform (DBDU) coats, DBDU trousers, helmet covers, floppy hats, and desert boots. The troops were also issued neckerchiefs, field pack and body armor vests, nighttime parkas with liner and trousers, gloves and liners, and—when available—desert boots. Almost 4 million underwear items (drawers, undershirts, bras, and panties) were issued. Chemical defense equipment requirements for U.S. and Coalition forces were met by using worldwide war reserve stocks, and commercial production of these items was surged. About 85 percent of Class II items were delivered initially to Log Base Bravo for distribution to units and other log bases.¹⁶

External support compensated for shortages in tentage. Army units deployed initially with insufficient tentage and cots. About 17,500 tents were withdrawn from stocks and sent to the theater, and another 16,000 tents were provided by Saudi Arabia. The Army leased over 25,000 tents and purchased 25,000 cots to provide adequate living conditions for units in the forward positions.¹⁷ Fifty-nine large fest tents were obtained from a German contractor for use as mess halls and similar facilities. "Most units deployed into SWA did not have adequate cots and tentage to bring with them ... [or] did not arrive in theater until long after the unit's arrival. The desert is much too harsh of an environment for soldiers to live in without shelter ... Had we not been able to buy or rent thousands of Saudi tents, we would not have been able to move units to the field as quickly as needed."¹⁸

¹⁶ ODCSLOG Sustainment Brochure, op. cit., passim.

¹⁷ Bartlett, op. cit.

¹⁸ Headquarters, 22nd Support Command, "Troop Support After Action Report," 8 April 1991.

3. Class III Supplies

External support was critical for the supply of petroleum products¹⁹

Adequate supplies of petroleum products, mostly fuel, were essential for the conduct of the war. The U.S. and other Coalition forces were almost entirely mechanized and motorized and used large amounts of fuel to move over the great distances in the theater. Three kinds of fuel were used in Southwest Asia. Armored vehicles and almost all of the trucks operated on diesel fuel (DF). Helicopters and aircraft operated on various blends of jet fuel type A (JA). Some automobiles and light trucks operated on gasoline (MOGAS).

The Army was responsible for providing fuel for its own units; for all land-based forces (Air Force, Navy, Marine Corps, and Special Operations); and for Coalition forces as directed. Packaged Class III products, primarily lubricants, were distributed through the general supply system, but most of the fuel was distributed through the petroleum distribution system operated by the Quartermaster Corps.

External support played a major, vital role in supply and distribution of bulk petroleum products, which constituted almost all of the total amount of Class III supplies used. The greatest contribution was direct access to local petroleum refineries.

From August 1990 to February 1991, 1.8 billion gallons of fuel were consumed in the theater. The Army used 13.6 percent of this fuel, including 89 percent of the MOGAS, 96 percent of the diesel, and 7 percent of the JA. The Air Force was the biggest user of the JA. To prepare for the attack phase, stocks of bulk petroleum products were established at five major log bases and at Al Jubayl, Saudi South, and Kharsania. Over 100 million gallons of bulk petroleum products were delivered during the movement of the two corps to initial attack positions from 16 January to 24 February 1991. Stocks of Class III packaged fuels were established starting in January 1991, with 70 percent of the total of about 6,500 tons going to Log Base Bravo. During the attack phase, the Army alone used 105 million gallons of fuel.²⁰

The concept for wholesale petroleum support was to obtain the petroleum products in bulk from the Saudi Arabian refineries along the eastern coast, then establish tactical petroleum terminals (TPTs) at Dhahran and from Dhahran extending

¹⁹ The principal source for this section is John R. Brinkerhoff and Theodore S. Silva, "Bulk Petroleum Supply" in *Combat Service Support*, Andrulis Research Corporation, 29 March 1996.

²⁰ ODCSLOG Sustainment Brochure, op. cit., passim.

northwestward along main supply route (MSR) Dodge, which ran parallel to the Iraqi border. Unit tank trucks would load fuel at the TPTs to fill their own smaller fuel system supply points (FSSPs) and vehicles using MSR Dodge could refuel directly from the TPTs. A pipeline was constructed to link the TPTs to the refineries and reduce the amount of petroleum products that had to be carried in tanker trucks, but the war ended before it could be used.

The requirement was to negotiate agreements to obtain petroleum products from the Saudis. The first Quartermaster petroleum command and control element in the theater was the 240th Petroleum Battalion.²¹ The 240th arrived in theater on 1 September 1990 and was the senior petroleum headquarters in the theater until the arrival of the 475th Petroleum Group Headquarters in November. Immediately upon arrival, Lieutenant Colonel Larry Matthews, the commander of the 240th, established contact with the Saudi Arabian Marketing and Refining Company (SAMARAC) to get the refined products that the U.S. and Coalition forces would need. He sent an officer and an NCO to each of the major refineries to act as Army liaison there and started the process of obtaining the petroleum products needed for the operation. Teams were sent to Oman and the United Arab Emirates. Lieutenant Colonel Matthews had served from 1986 to 1988 at the Defense Fuel Supply Center Office in Bahrain, and he knew the oil people and the oil situation in the Persian Gulf.

After the arrival of the 475th Group, under the command of Colonel John Koshan, the initial arrangements with the local suppliers were continued and extended using a petroleum liaison detachment. Several of these detachments had been formed in 1988 specifically to act as liaison with host nation oil ministries and companies to obtain local supplies for Army use. Although the detachments were small (25 personnel), they were commanded by lieutenant colonels and had other senior officer and enlisted personnel with petroleum supply experience. Two detachments deployed to Southwest Asia along with the 475th Group Headquarters. One of these detachments was used at KKMC as the forward operations element of the 475th Group Headquarters, coordinating stockage and distribution of fuel to the log bases. The other detachment became the central issue and distribution planning element for fuel and water, acting in effect as the materiel management center for these two commodities. Teams were sent to the forward areas and to the Saudi sources of supply to control the amount and types of fuel at the TPTs and

²¹ Interview with Colonel Larry Matthews, 22 May 1995. Colonel Matthews was the Commander, 49th Petroleum Group, at the time of the interview.

coordinate procurement and distribution of all petroleum products for the U.S. Army, Marine Corps, and Air Force and for Coalition forces.

When the air war started, Colonel Koshan set up an operations center to coordinate supply, distribution, and demand for fuel. After lengthy negotiations with the Saudi Government, the petroleum operations center became active on 18 January 1991 in space formerly occupied by SAMARAC. Military personnel at the center coordinated the needs of ARCENT, MARCENT, CENTAF, and other claimants directly with the representatives of SAMARAC and other sources of supply. The 475th Group received other Service demand estimates from the Joint Petroleum Office at Headquarters, CENTCOM, estimated the demand for ARCENT use, and arranged for the distribution of fuel to the using organizations.

The 475th Group Headquarters, an Army Reserve Unit, found that the civilian skills and attitudes of its reservists came in handy, enabling them to work well in what was essentially an unregulated environment. The reservists found that they themselves had to go out and get the things they needed to do their work and that the secret to getting into operation was to learn how to obtain support from the economy. The 475th staff had a hard time getting things from the Army but an easy time getting things from local contractors and suppliers once their ordering officers were able to purchase supplies and services from the local economy.

Since fuel was plentiful, the major problem in Southwest Asia was to move the fuel inland from the refineries, store it, and dispense it to the tanks, trucks, helicopters, and aircraft of the Army, Air Force, and Marine Corps. This meant that the TPTs had to be kept full of fuel. A standard tactical petroleum terminal consists of 18 fuel storage tanks, each with a 5,000 barrel (e.g., 210,000 gallons) capacity interconnected and fitted with diesel engine powered pumps and fittings to dispense diesel fuel, jet fuel, and MOGAS to armored vehicles, tank trucks, vehicles, or helicopters. When filled, a standard TPT holds 3,700,000 gallons of fuel. A standard TPT is a massive installation, often extending over 40 acres of ground and requiring seventy-four 20-foot containers.²² Operation Desert Storm provided the first opportunity to use the TPT.

At its peak, the petroleum supply system consisted of 7 headquarters, 16 petroleum companies, and 28 petroleum truck companies. Each corps support command had a battalion headquarters, and the 22nd SUPCOM had a petroleum group

²² The first initial in TPT stands for "tactical," not "transportable." Confusion about this caused some senior officers to have greater expectations for the mobility of TPTs than were warranted.

with 3 petroleum battalion headquarters. Medium truck petroleum companies were assigned to the petroleum battalions to provide a dedicated line-haul capability for fuel. The allocation of petroleum supply units in Southwest Asia is shown in Table 2. This represented about one-third of the battalion headquarters, about half of the supply and operating companies, and about 88 percent of the petroleum truck companies in the Army's force structure.

Table 2. Allocation of Petroleum Units in Southwest Asia

	XVIII Corps	VII Corps	22nd SUPCOM	Total
Group Headquarters	-	-	1	1
Battalion Headquarters	1*	2	3	6
Supply Company	3	4	4	11
Operations Company	-	-	5	5
Liaison Detachment	-	-	2	2
Medium Truck Co. Petroleum	2	2	6	10
Medium Truck Co. 5,000 gal	6	4	7	17

* A supply and service battalion headquarters was used for the petroleum function.

The 416th Engineer Command laid 290 miles of petroleum pipeline from coastal locations inland to Log Bases Alpha and Echo. One multiple line carried fuel 26 miles from the ARAMCO and Petmark refineries to Al Jubayl Port and the King Fahd International Airport. Another segment of 7 miles ran from Log Base Alpha to KKMC Airport. The main line from the coast to Log Bases Bastogne and Alpha was completed on 1 March 1991—the day after the cease fire. Had the petroleum pipelines been started earlier, they could have contributed a great deal to the overall logistical effort by freeing up trucks for other missions.

Without the pipeline, transportation of the fuel was a major problem. Military tanker truck-trailers met about half of the need. ARCENT arranged for all available commercial tank-trucks, many of them with a 20,000-gallon capacity. The large commercial tankers were used to move fuel from the Dhahran terminal to the 10 TPTs along the MSRs. Another TPT was installed on a ship to be available to support a possible amphibious landing.

The availability of petroleum refineries in Saudi Arabia meant that the Army's fuel trucks could fill up there and move directly to the Army's tactical petroleum

terminals for issue to tankers from using units or directly to vehicles from using units.²³ The Army developed the Inland Petroleum Distribution System (IPDS) for use in undeveloped theaters that called for delivery of petroleum products from ships to tank farms at the coast. From the coastal tank farms the fuel would move by pipeline to inland tank farms and then to the wholesale tactical petroleum terminals and then to retail fueling points at the units. In Southwest Asia, the flexible hoses and special facilities for unloading ships and the coastal tank farms were not built and not needed. If this had been an underdeveloped theater, it would have taken 10 more petroleum pipeline construction companies and 10 more petroleum operating companies to build and operate the additional facilities needed to receive, store, and distribute enough fuel to support the operation, and 32 additional petroleum tank truck companies to move the fuel from the tank farms to the TPTs.

4. Class IV Supplies

External support was critical for barrier and construction material

Over \$25 million was spent procuring Class IV barrier and construction material in the theater.²⁴ Fourteen thousand tons of Class IV barrier and construction material were shipped to the theater from war reserve stocks and increased production.²⁵ However, most of these materials arrived too late in the deployment to provide for the early deploying units. Blanket purchase agreements were used to purchase sandbags and other barrier materials locally, and a contract was awarded to a local firm to manufacture concrete barriers for troop protection. Much of the lumber, cement, gravel, asphalt, and other construction materials necessary for the construction program was furnished by contractors. Blanket purchase agreements funded by the Japanese Government were used to purchase construction material. In the case of Class IV supplies, external support had to be used, not because the Army had insufficient supplies, but because those supplies could not be shipped to the theater fast enough to meet early demands.

²³ The Navy had the responsibility to develop a complementary Off-Shore Petroleum Discharge System (OPDS) to get the fuel from the ships to the shore, but it did not do so. Fortunately, the OPDS was not needed in this war.

²⁴ Bartlett, op. cit.

²⁵ ODCSLOG Sustainment Brochure, op. cit., passim.

5. Class V Supplies

External support was critical for supply of ammunition and missiles

Ammunition was a big item. Over 300,000 tons of ammunition were received in the theater during the war. Movement of Class V took an average of 70 percent of theater trailer assets.²⁶ The business of loading, unloading, classifying, and inspecting missiles and ammunition in the theater was carried out almost exclusively by military personnel. Some DoD civilian employees and a few contractor technical representatives were used for some systems, such as Patriot missiles. However, as discussed in Section D.9, Transportation, the distribution of the ammunition to using units was carried out to a major degree using external support. The Army could not have accomplished its ammunition supply function without external support.

6. Class VII Supplies

External support was critical for wheeled vehicles, useful for minor equipment items, and trivial for combat vehicle supply

There was a continuing shortage of trucks and trailers, and external sources provided numerous donated and commercial vehicles to compensate for this. See Section D.9, Transportation, below.

Many smaller items, including construction equipment, battery charges, batteries, and 500 forklifts, were obtained by local leasing or purchase.²⁷

Many major items, especially combat vehicles, were provided from the Army supply system. Substantial numbers of replacements for major equipment items were shipped to the theater. Many of the deploying units, particularly truck units, had arrived without all of their authorized equipment and had to be filled up. Some old items were replaced in the theater by new items, including a new model of tanks, new hospital assemblages, and new water purification units. A Weapon System Replacement Operation was established to provide both the weapon (e.g., a tank) and a trained crew in a "ready-to-fight" condition to replace combat losses. Theater stockage of major end items for replacements included 429 tanks, 356 armored fighting vehicles, 198 mortars

²⁶ Ibid.

²⁷ Bartlett, op. cit.

and artillery pieces, and 194 aircraft.²⁸ Contractors were used extensively to help process and prepare these items for issue to using units.

7. Class VIII Supplies

External support was useful for medical supplies

The majority of the medical supplies, pharmaceuticals, and blood stocked in the theater was provided by DoD. The Army was executive agent for medical supplies and equipment for the entire theater, supporting 44 Army hospitals, 15 Air Force hospitals, 2 Navy hospitals, and 2 Navy hospital ships. Medical supplies were provided by the medical logistics units of the theater medical command and the medical logistics battalions of the two corps support commands.²⁹

However, the medical supply system had to rely on external support to distribute their supplies and to provide pallets, crates, and boxes to break down the supplies for delivery to the using units. Blanket purchase agreements were used to obtain consumable supplies for hospital operations. The medical contracting officer bought incubators, medical gases, and other medical supplies to support the restoration of Kuwait after the cease-fire—requirements to which the medical supply system did not respond in a timely manner.³⁰

8. Class IX Supplies

External support was critical for repair parts

The war generated massive demand for repair parts. From August 1990 through February 1991, about 1.6 million requisitions were submitted for parts valued at over \$4 billion. After the cease fire, additional requisitions for parts were submitted. Over 88 percent of the additional requisitions were filled from CONUS stocks and shipped to the theater. However, many using units and maintenance units in the theater complained of a shortage of Class IX supplies during the war. The problem may have been that the units were unaware of the parts' availability in the theater rather than a real shortage of parts.

The difficulty in obtaining repair parts through the military supply system caused many users to purchase repair parts from local civilian sources for some of their military

²⁸ ODCSLOG Sustainment Brochure, op. cit.

²⁹ Ibid.

³⁰ Bartlett, op. cit.

equipment and for the commercial equipment they were operating. Blanket purchase agreements (BPAs) were arranged to allow maintenance units to obtain repair parts from local sources. These covered most of the support equipment repair parts needed to maintain mission readiness.³¹

Local purchases of repair parts was critical when VII Corps arrived in Southwest Asia. VII Corps units arrived with broken equipment and significant shortages of repair parts in their authorized stockage lists. BPAs were used to support the maintenance of non-tactical vehicles, particularly those supplied by the Government of Japan. Twenty vendors supplied about \$12 million in repair parts each month during the build-up to the Attack Phase. During the Redeployment Phase, the level of local purchases of repair parts was about \$42 million per month. Repair parts were purchased by 300 local call officers from 200 maintenance units.³²

Owing in great measure to the availability of repair parts from local sources, the overall operational readiness rate of equipment in the theater was 90 percent.³³

D. SERVICE FUNCTIONS

Services provided to the military forces include aerial supply operations, communications, construction, enemy prisoner of war operations, field services, maintenance, medical, personnel service support, and transportation. Each of these functions is assigned a subjective rating of the extent to which external support contributed to the delivery of the services—critical, useful, or trivial.

1. Aerial Supply Operations

External support was trivial to aerial supply (air drop) operations

Air drops were used during the ground war to provide urgent delivery of ammunition and fuel to units that had advanced too rapidly for their ground support units. In addition, air drop operations were used extensively to deliver food and medical supplies to Kurdish refugees during Operation Provide Comfort. Military units conducted all air delivery operations.

³¹ Ibid.

³² Ibid.

³³ ODCSLOG Sustainment Brochure, op. cit.

2. Communications

External support was useful to the communications function

Army communications in Southwest Asia was highly effective for the combat forces, poor for the support forces at EAC, and good at the strategic level connecting the theater with CONUS.³⁴ The tactical radio systems used by the combat forces worked well and did not use external support. However, the area communications system that was to have been installed to support the two corps and theater army combat support (CS) and combat service support (CSS) units was inadequate and had to be augmented with several forms of external support.

The Saudi national telephone system was modern and reliable and was used to its capacity. Great use was made of cellular telephones that were procured locally and linked on the local net. In fact, many CSS commanders at EAC report that their only communications was provided by a soldier with a rented cellular telephone sitting day and night in a rented utility vehicle. The theater communications system that linked the theater and component headquarters with CONUS and to each other relied partially on commercial equipment, including switches installed in Saudi Arabia and commercial satellites. Commercial vendors supplied a wide range of communications, including voice and facsimile.³⁵ Fax machines, copiers, and GPS receivers were obtained by local purchase. The International Marine Satellite Terminals were leased for 6 months to provide theater communications before the Army equipment could be put into place.³⁶ The utility of commercial equipment was recognized by the 22nd SUPCOM, as follows: "In recognition of special theater requirements, commercial equipment was purchased. This equipment augmented existing military equipment in some cases. Commercial equipment performed (sic) a requirement that was unanticipated."³⁷

³⁴ Interview, Lieutenant General Peter A. Kind, DA DCS Information Management, 2 September 1992.

³⁵ Department of Defense, "Command, Control, Communications (C3) and Space," in *Conduct of the Persian Gulf War*, pp. K25-K39.

³⁶ Bartlett, op. cit.

³⁷ Headquarters, 22nd Support Command, "C/E Division After Action Report," 8 April 1991.

3. Construction

External support was critical for construction

Most of the major construction in Southwest Asia during the Persian Gulf War was accomplished by contractors as intended by the Corps of Engineers.³⁸ At the outset of the War with Iraq, the Corps of Engineers had developed a military force structure that was based on the following three principles:³⁹

1. Military engineering units would focus on combat support to the divisions and corps. The capability to perform heavy construction of airfields, roads, and large structures or complexes would be eliminated from the force structure. Engineer construction battalions would be eliminated, and combat heavy battalions with limited capability for earthmoving and light construction would be provided at the corps and theater army level.
2. Most of the units to perform the Engineer mission at echelons above corps would be placed in the Reserve components. The Active Army would provide an ability to support the Active divisions and one corps, plus some capability to support at EAC. The RC would provide the ability to support the Guard divisions, the additional corps, and most of the EAC capability, particularly specialized detachments for which there were few peacetime requirements.
3. More reliance would be placed on contractors to perform heavy construction in a theater of operations.

The weight of the Engineer effort in Southwest Asia was placed in the divisions and corps. Each division in the operation had three engineer battalions assigned or attached instead of the one battalion provided for in the tables of organization and equipment (TOEs). Of the 30 engineer battalions in the theater, 26 were allocated to the divisions and corps. Of the 4 battalions at EAC, 2 were combat heavy, 1 was topographic, and 1 was a composite battalion for facilities maintenance.⁴⁰

The 416th Engineer Command, the senior Engineer headquarters in ARCENT, had few units working for it directly but had major responsibilities for planning, designing, and engineering the construction to be accomplished by both the military units

38 John R Brinkerhoff, "Engineer Support at Echelons Above Corps: The 416th Engineer Command," in *United States Army Reserve in Operation Desert Storm*, Andrulis Research Corporation, 18 May 1992.

39 Ibid., pp. 4-5.

40 Ibid., p. 15.

and the contractors. This design and engineering work had to be done before contracts could be let with local or international construction companies.

The Middle East/Africa Projects Office (MEAPO), Winchester Virginia, was the DoD design and construction agent for the Middle East and Africa with field offices in Egypt, Oman, Bahrain, Kuwait, Morocco, and Saudi Arabia. The Saudi Arabian field office was established in Riyadh with contract specialists, real estate specialists, and construction engineers. A Dhahran Area Office (DAO) was set up to facilitate construction contracting and staffed with 110 personnel. Some of the design work was done by architect-engineer firms under contract to MEAPO.

Although the theater facilities policy was to have an austere support base (as opposed to the elaborate facilities built in Vietnam), a lot of work had to be done. Most of the housing used by EAC troops was in existing facilities leased from the Saudi Arabian Government. Since most of these facilities were leased unfurnished, additional contracts had to be awarded by ARCENT for furniture and other housekeeping items. Six austere Life Support Areas (LSAs) were to be built for troop occupancy, but only two were used. Most of the troops at corps and below lived in the field in tents or their own vehicles. However, numerous airfields, heliports, logistical bases, roads, and temporary or semi-permanent structures for offices, warehouses, and maintenance shops had to be built. In the redeployment phase, wash racks had to be constructed to allow the returning vehicles to be cleansed of desert dust to meet U.S. Department of Agriculture standards before they were loaded onto ships bound for the United States. From 18 January 1991 to 31 March 1991, the 416th Engineer Command alone approved 42 construction projects for a total cost of \$278 million.

Real Estate was also a major activity. Land and facilities needed to support the operations had to be leased, particularly in Operation Desert Storm (ODS) because of the extraordinary reliance placed on external support. Leased facilities were absolutely necessary to provide beds and sanitary facilities for the incoming troops. By May 1991, leases had been negotiated for about \$150 million in annual rental value.

The Army supply system tended to give Engineer construction materials a low priority. Heavy reliance was placed on local purchase orders to obtain lumber, asphalt, cement, gravel, and plumbing and electrical materials. The 416th Engineer Command also obtained 163 pieces of major engineering equipment worth \$10 million by local purchase, and this entire purchase was funded by the Government of Japan. Another \$2 million was used to rent engineer equipment.

Much of the construction work in the theater was performed by civilian contractors and is generally thought to have gone well. The engineer unit commanders and MEAPO differ, however, on contractor performance and the utility of civilian contractors to perform construction work in the theater of operations. Engineer commanders generally have criticized the performance of contractors in this operation. They report problems and lack of responsiveness and say that when the shooting started, contract workers proved to be unreliable. When hostilities commenced, many contractor personnel in the corps rear areas and the forward part of the communications zone simply stopped working and left the area of potential danger for periods from 3 days to 3 weeks.⁴¹ Some of the projects had to be completed by the troop units. In some cases, U.S. troops were teamed with contractor drivers with orders to take over the vehicle and drive on if the contractor personnel refused to go further. U.S. troops also operated and put to use contractor equipment abandoned on project sites.⁴² After the initial combat experience, many civilian contractors resumed work on the projects, particularly after the civilian workers were issued chemical protective masks.⁴³

The experience of the engineer commanders has caused them to be less positive about relying on contractors than they were before the war. Contractors were found to be useful either for repetitive low-tech construction, such as building latrines or wash basins, or for sophisticated one-time projects relying heavily on local materials and practices. "More often than not, contractors could not meet the urgent needs of requesting units. Significant delays occurred in such critical projects as latrine, shower, wash basin construction, tactical petroleum terminals, convoy support centers, and ammunition supply points."⁴⁴ Engineer commanders report that contract construction was useful in supplementing troop construction in the theater but would have been more useful if the commanders responsible for getting the work done had had more control over the contractors to assure that an integrated effort would not be stopped completely if the contractors left a combat area. For these reasons, the engineer commanders conclude that engineer combat heavy battalions are needed and should be assigned the critical tasks, with contractors used for essential but less urgent tasks.⁴⁵

41 Ibid., p. 63.

42 Ibid., p. 65.

43 Headquarters, 22nd Support Command, "Engineer After Action Report," 9 April 1991.

44 Ibid.

45 Ibid.

MEAPO's experience with contractors was more positive than that of the engineers in troop units. MEAPO believes that the contractors performed well enough to validate the policy of relying on them to meet some of the construction requirements during a contingency operation. MEAPO alone awarded \$300 million in construction contracts and reported satisfactory performance by contractors. Contract construction occurred in Egypt, UAE, and Bahrain, as well as Saudi Arabia. Contractors filled the gap until substantial numbers of engineer units arrived in the theater. From August to October 1990, contractors were the only source of construction capability available at EAC because divisional engineer battalions focused entirely on combat support. MEAPO points out that it is unrealistic to expect civilians to behave in the same way as soldiers in a combat area. For one thing, no preparations were made to provide contractor personnel even a basic capability to deal with the threat of chemical attack and SCUDs. Nevertheless, some contractors did continue to work despite the danger, and in all cases, contractor personnel returned to their jobs after they were provided the same chemical protective masks issued to the troops. Contractors constructing the KKMC Airport extension continued to work under the threat of SCUD attacks. Overall, many contractor personnel showed a high degree of patriotism and took personal as well as monetary risks to support the war effort.

The 22nd Support Command reported that contract construction worked well in the theater. "Excellent . . . support, skilled personnel, materiel, and specialized equipment were readily available Contract construction was limited only by funds availability and availability of personnel to develop and manage projects."⁴⁶

The policy of relying on contractors is an important issue because it was used to justify pre-war reductions in engineer unit force structure. The experience of ODS does not provide a definitive answer. Some indicators suggest that it may be unrealistic to expect contractors to operate in combat areas and that construction projects in the corps rear areas should be accomplished by troops. Had the combat phase continued with heavy fighting as originally envisioned, it is possible that some contractors would have left their jobs, making the reduced engineer structure inadequate to support sustained combat operations. Nevertheless, contractors did an enormous amount of work and most of them did it very well, with some working under dangerous conditions. The lesson is that if contractors are to be relied upon to support contingency operations, they should be

⁴⁶ 22nd Support Command After Action Report, "Host Nation Support (HNS) for Engineer Construction," Vol. 15, April 1991, p. 271.

prepared and equipped beforehand for the conditions to be found in a theater of operations, including provision of appropriate life support items.

4. Enemy Prisoner of War Operations

External support was critical for enemy prisoner of war operations

The Army's enemy prisoner of war (EPW) operations in Desert Storm relied almost exclusively on external support. Except for the military police units that built, secured, and operated four camps, all of the resources needed to intern almost 70,000 EPWs were provided by U.S. Government contracts. The Government of Saudi Arabia reimbursed most of the costs of these contracts. This was fortunate, for the failure to provide for EPW support would have meant either a major embarrassment to the Government of the United States or a substantial diversion of resources available for support of U.S. troops.

Army EPW operations were under the command of the 800th Military Police Brigade, which specialized in this function. The 800th received EPW from corps collection points, moved them to the rear, processed them, and interned them in four EPW camps until after the cease fire. Supplies for the EPW were not available from the Army's supply system, and the Army ignored the pleas of the 800th MP Brigade to provide the essentials. Most 800th MP Brigade requisitions for supplies for the EPWs in their charge were canceled as "not authorized" because the supply system recognized only the authorizations for the MP unit personnel themselves.⁴⁷ When the first EPWs came into the camps, their MP guards gave up their own tents and clothing to shelter and cloth the EPWs, and shared their rations with the prisoners. Urgent efforts by the 800th MP Brigade convinced the authorities of the need for these items, and the contracting system responded.

Contractors met the needs of the EPWs almost entirely, with substantial support also provided by the resources and ingenuity of the 800th Military Policy (MP) Brigade. CENTCOM had assumed that about 100,000 EPWs would be captured during the war and transferred to Saudi control after 5 days. However, the war was over before Saudi camps were ready, and ARCENT had to support a higher than anticipated number of EPWs for several weeks. When requisitions for EPW clothing did arrive at the National Inventory Control Point of the Army Materiel Command, there were no stocks of EPW

⁴⁷ 800th MP Brigade, *After-Action Report, 800th MP Brigade (PW)*, 1 June 1991, p. N-1, recommends a separate UIC for the EPWs to provide a basis for the supply system to act.

clothing available. New contracts would have been necessary and items would not have been delivered to the camps for 2 to 3 months.⁴⁸

Support for the EPWs was provided almost entirely by contracts arranged by the U.S. Army but paid for by the Saudi Arabian Government. Contracts were awarded for food, cooking utensils, latrines, trash services, bottled and bulk water, temporary mosque tents, prayer mats, toothpaste, razors, shaving cream, cigarettes, and everything else the prisoners needed. The U. S. Government contracted for 50,000 sets of clothing, blankets, bedding, shoes, and prayer rugs for the EPWs. Even these plus additional smaller local purchases were not sufficient to support the camps through the operation.⁴⁹

Feeding the EPWs was a delicate matter in Desert Storm because of the dietary rules of Islam, and a monumental job because of the large numbers of people to be fed. It took 150,000 meals per day and 1.5 million gallons of water per day to meet the basic needs of the 50,000 to 60,000 EPWs held during the peak of camp operations in March 1991 plus the 6,000 U.S. MPs and hundreds of interpreters operating the camps. The Army supplied food for the MPs but not for the prisoners or interpreters. An existing contract with a private company, Astra Catering, was extended to provide 4.5 million German rations acceptable to both the U.S. and Saudi Forces for EPW consumption. While waiting for the German rations to arrive, the caterer provided frozen chicken and lamb, rice, and vegetables along with burners, cooking pots, and cooking utensils. In the initial period, some camps were using U.S. or Saudi ready-to-eat rations, while others were serving fresh food, and this caused problems with EPWs who were transferred from one camp to another. As the EPW population increased, meal preparation and the related sanitation problems became a difficult problem.⁵⁰

Logistical support for the camps was improvised. Army units were not available to provide dedicated support for EPW operation. The 321st Materiel Management Center (MMC) was helpful and went to bat several times to provide emergency assistance to the overloaded emergency logisticians of the 800th MP Brigade. The 800th MP Brigade established provisional Logistical Control Centers in each of the two camp areas to provide a central point to receive, issue, and store supplies and equipment for the camps. They used field ordering officers to make local purchases. They coordinated transportation and delivery of the supplies and equipment, as well as the EPWs. The MP

⁴⁸ Ibid., p. N-10.

⁴⁹ Major Alan A. Ecke, G4, 800th MP Brigade, EPW Conference, 19 October 1991.

⁵⁰ 301st MP Camp, Briefing presented at the 800th MP Brigade EPW Conference, 19 October 1991.

units had minimal training to perform this logistical management mission, and they had to rely on their civilian skills to perform this unexpected work. Because of the makeshift, reactive nature of these logistical operations, it is likely that some inefficiencies resulted, but the work got done, and the EPWs did not suffer.

The MPs expected to receive more construction support from the engineers than was provided. Engineer support for EPW camp construction was limited because most of the engineer combat heavy battalions had been allocated to the combat corps for the ground war, and the two battalions available for rear area work were engaged heavily in MSR maintenance, pipeline construction, and airfield construction and maintenance. A memorandum of agreement signed in January 1991 between the 800th MP Brigade and the 416th Engineer Command provided that the engineers would prepare construction plans for the camps and submit requests for latrines, showers, washstands, guard towers, and lighting systems to be made by local contractors. Engineer companies were to provide construction support equipment, prime power teams for electrical systems, and technical assistance. The 800th MP Brigade provided soldiers to construct the camps and procured all materials and equipment for their construction.⁵¹ Except for some 360 miles of triple concertina barbed wire supplied from theater stocks and some lighting sets, the materials for construction of the camps were purchased locally and paid for by the Saudi Arabians. Most of the work in constructing the camps was performed by the MPs.

Communications was a problem for the MPs as it was with many other combat support and combat service support elements. The camps had enough telephone equipment to establish effective communications inside the camps to assure proper security of the EPW. However, the camp headquarters and the guard and escort guard companies generally had insufficient FM radios to establish satisfactory communications to operate the camp. All of the camps had to overcome problems communicating externally with each other and with the 800th MP Brigade Headquarters. The EPW units were authorized insufficient communications capability to operate under the conditions of Operation Desert Storm, and some communications equipment that would have been very useful was taken from the units at the mobilization stations. Local procurement of communications assets helped, but communications remained a major problem.

Transporting EPWs to and among the camps and moving supplies to the camps were also problematic. MP escort guard companies charged with securing prisoners being moved from corps holding areas to the camps did not have organic vehicles to

⁵¹ Brinkerhoff, "Engineer Support at Echelons Above Corps," *op.cit.*, p.40.

transport EPWs. The 800th MP Brigade had to provide its own transportation support. A variety of locally procured trucks and buses were used to move the EPWs from the corps holding areas to the camps and from the U.S. camps to the Saudi camps. The 800th MP Brigade had to create and operate two massive motor pools for which it had to train some MPs to be truck drivers and convert others to be automotive mechanics. Two hundred buses were acquired from the Saudis and 200 MPs were trained to drive them. In addition, the 800th MP Brigade had to organize convoys to move all of its own supplies to support the camps. The EPW camps were visited daily by large numbers of trucks bearing rations, clothing, other essential supplies, and EPWs arriving from corps holding areas or other camps. The supply trucks would travel right into the camps to be unloaded by the prisoners and stored under direction of the MPs inside the camps. It was a scene of mass confusion and purposeful activity that would not have been possible if the prisoners had not been cooperative.

Maintenance of vehicles was difficult because the MP units had very limited organic maintenance capability. When a vehicle broke down, the MP units themselves had almost no capability to repair the vehicle or tow it to a maintenance facility. Basic ordering agreements were used to obtain towing and maintenance services from local contractors. The Army maintenance system provided good support for military vehicles but was not designed to maintain the contractor-supplied vehicles, which were supposed to be maintained by the contractors themselves. Maintenance of military vehicles organic to the Brigade's units was good, with an availability rate of 85 to 95 percent throughout the operation.⁵² It was a different story, however, with the numerous contract vehicles—particularly buses—that the MPs used to augment their modest organic transportation capability. Contractor-furnished maintenance was generally poor, and the availability of the contract vehicles ranged from 50 to 65 percent.⁵³ Vehicle maintenance was often done by MPs who were mechanics in civilian life, but, lacking parts and tools, they were limited in what they could do.

Despite the problems, there were some successes. The 403rd MP Camp turned to the civilian skills of its personnel and adopted an aggressive procurement program to keep its fleet of 29 U.S. trucks, 3 German water trucks, a bulldozer, 2 HEMMTs, 2 forklifts, a scooploader, 5 locally acquired 10-ton trucks of uncertain make, and a wide

⁵² Headquarters, 800th MP Brigade, "Operation Desert Storm Draft," 14 May 1992.

⁵³ G4 Briefing, EPW Conference, 19 October 1991, amplified by interview, Brigadier General Joseph Conlon III, 4 June 1992.

variety of U.S. and foreign generators operational. The 403rd was able to keep 100 percent of this equipment running during a period of 47 days—an exceptional record.

Medical Care for EPWs was austere and was a major concern throughout the operation. An EPW camp headquarters is authorized one doctor and nine medical technicians to provide emergency treatment and supervise EPW medical personnel used to treat the EPW. The camp medical section is not intended to provide primary medical care for the 12,000 EPWs a camp is designed to intern. Additional medical personnel were used to care for the EPWs. At one camp, a team of volunteer U.S. Army and Saudi doctors arrived after the fighting was over to help take care of the EPWs. Captured Iraqi doctors and medical personnel also were used extensively in the camps. U.S. Army medical facilities in the theater were also used to provide medical treatment for EPWs. The 300th Field Hospital was assigned the primary mission of providing medical support for EPW camps.⁵⁴ Once the fighting was ended, the theater medical system was able to accommodate EPW patients without difficulty because of the fewer than expected U.S. and Coalition casualties.

Interpreters were needed in the camps to communicate in Arabic with the Iraqi prisoners. There was no central agency from which to obtain interpreters, and requests for them through Army intelligence and personnel channels were fruitless. The 800th MP Brigade obtained interpreters from a variety of sources, including the Saudi Ministry of Defense and Aviation, the Saudi Commander of the Eastern Province, and other host nation support channels. Most of the interpreters were civilian volunteers, and some were reluctant to live in the austere environment of the EPW camps and work the long hours required to run the camps. The arrival on 27 February 1991 of 60 Kuwaiti civilian volunteer translators added to the problem, for these people thought they would be assigned to work in Kuwait and were unhappy with camp life and work. Some of the interpreters simply left the camps. As a result, the supply and availability of interpreters was uncertain, and the camps were unable to use them with great effectiveness. By mid-March 1991, 124 Saudi and 137 Kuwaiti interpreters were supporting the operations of the brigade. They worked closely with the MPs inside the camps under a variety of arrangements determined by the camp commanders. Although there were never enough Arabic interpreters, most of those that were available did an outstanding job.⁵⁵

⁵⁴ The 300th Field Hospital is claimed by the 800th Brigade, but the unit itself insists that it reported to the 173rd Medical Group. Telephone interview, Mr. Vershinski, 300th Field Hospital, 21 February 1991.

⁵⁵ G1 and G2 Briefings, EPW Conference, 19 October 1991.

The agreements with the Kingdom of Saudi Arabia (KSA) provided that the Iraqi prisoners would be transferred to KSA control. The KSA established four EPW camps—one of them for officers only. Although these camps as constructed were smaller than originally intended, they sufficed to receive the EPWs from the U.S. camps during the war and as the EPW mission phased out later. Transfer operations were facilitated by close coordination between the 800th MP Brigade and the KSA Ministry of Defense and Aviation (MODA). Major General Hatem Al Okasi was responsible for KSA EPW operations in the theater and the operation of the four KSA camps.⁵⁶ General Okasi and his military police units acted professionally and in accordance with the highest standards of international law. The KSA camps served well-prepared food, provided excellent medical care, and had adequate water and sanitation.⁵⁷ The KSA military hospitals provided medical care for Iraqi prisoners, including some in U.S. custody.

The Army did not have to provide full support for EPW operations in the Southwest Asia Theater because the Kingdom of Saudi Arabia was willing and able to support the mission. This was fortunate because the Army would have been hard-pressed to provide adequate logistical support for its own forces as well as for large numbers of prisoners. Initially, CINCENT emphasized defending Saudi Arabia and then liberating Kuwait. Few prisoners were expected during the defensive phase, and even after a planning estimate of 100,000 EPWs was adopted, priority for logistical support was given to the U.S. and Coalition forces to accomplish the offensive mission. By that time an agreement between the United States and the Kingdom of Saudi Arabia had specified, among other things, that the entire cost of EPW operations would be borne by Saudi Arabia.⁵⁸ This allowed the Army to concentrate on its principal mission of defeating Saddam Hussein.

5. Field Services

External support was useful for field services

Field services provide showers, laundry, clothing exchange, and clothing and equipment repair for the troops. Field bakeries provide fresh bread.

⁵⁶ Letter, Lieutenant Colonel Frederick W. See, 26 December 1991. Lieutenant Colonel See was in charge of EPW advisory team operations.

⁵⁷ 800th After Action Report, p. B-1.

⁵⁸ Letter, Colonel Douglas H. Cobb, Provost Marshal, Third U.S. Army, 13 April 1992.

For soldiers in the forward areas, the shower, laundry, and clothing exchange and repair services were widely used and well received. Many units at log bases also built their own showers and latrines, often using prefabricated units prepared by local contractors. Many soldiers in the theater lived in facilities with running water and showers that were provided by local contractors. (See Section D.3, Construction, above.) If external sources had not been available and all of the troops had lived in the field, 10 more laundry and bath companies would have been needed to help keep the troops clean and clothed. Extensive use was made of local laundry contracts and local purchase of residential-type washers and dryers.⁵⁹ Contracts were awarded for latrines and waste removal services.⁶⁰

Bakery units were not successful in Southwest Asia because they had old equipment, the new pre-processed rations did not need a fresh bread supplement, and fresh bread was available locally.

6. Maintenance

External support was critical to the maintenance function

Most maintenance of equipment in Southwest Asia was performed by military troop units at the retail level and combined military-civilian organizations of the Army Materiel Command (AMC) at the wholesale level. Considerable use was made of AMC employees and technical representatives of U.S. contractors, particularly for missile and aircraft maintenance. The Defense Logistics Agency established in Saudi Arabia a Defense Reutilization and Marketing Office (DRMO) that managed the disposal of surplus items and hazardous materials—a capability not provided in the Army's military supply system.⁶¹

However, a great deal of the maintenance was done by local contractors. Blanket Purchase Agreements (BPAs) were a major factor in keeping wheeled vehicles, materials handling equipment, and construction equipment operational. BPAs were established for hose fabrication, hydraulic cylinder repair, fuel pump repair, starter repair, alternator repair, radiator repair, brake and clutch assembly repair, electrical and electronic supplies, tires, and printed material.⁶² Contractors maintained almost all of the vehicles and other

⁵⁹ Headquarters, 22nd Support Command, "Field Services After Action Report," 6 April 1991.

⁶⁰ Bartlett, op. cit.

⁶¹ Headquarters, 22nd Support Command, "22d Support Command After Action Report," 6 April 1991.

⁶² Bartlett, op. cit.

equipment that was donated or leased. Without contractor support, the Army could not have kept its equipment operational.

7. Medical

External support was helpful for medical support

The primary contribution of the Saudi Arabian Government to the theater medical system was to allow Army physicians and medical personnel to treat U.S. patients at Saudi Arabian Hospitals. Nine of the 44 Army hospital units in the theater were assigned to existing permanent facilities. As a result, ARCENT was able to establish the number of theater beds thought necessary to handle estimated casualties despite a shortage of hospital assemblages. The arrangement worked well in general but was not without problems.

The medical force structure in the theater was austere in the first two months, but there was a gradual build-up until 28 December 1990, and then a large number of units arrived throughout January 1991, bringing the medical force structure to its full size, although it took another month to attain its full capability. This build-up profile developed because of the generally low priority given support units of all kinds during the early stages of the war. It was not until after the combat units were in place that the medical force structure achieved its design goal of 13,580 beds, including 400 beds set aside to treat enemy prisoners of war.⁶³

The Army Medical Department (AMEDD) was in the middle of a transition from one generation of equipment to another when the war started but was able to equip most of its units in Southwest Asia with the latest equipment. The Vietnam War vintage Mobile Unit Self-Contained Transportable (MUST) equipment was being replaced by the Deployable Medical Systems (DEPMEDS) equipment. MUST uses a set of inflatable plastic buildings to provide a suitable environment for surgery and other medical procedures. DEPMEDS uses prefabricated shelters with equipment installed for various medical procedures that are linked together by passageways to form a complete hospital. Both systems need auxiliary generators and pumps, and both systems use tents for housing the troops working at the hospital. The big advantage to DEPMEDS is that it represents 1980s medical technology.

63. Interview, Colonel Demetrios Tsoulos, ARCENT Surgeon, 14 December 1992.

The first hospital that arrived in Saudi Arabia in September 1990 found that the prepositioned hospital set in Bahrain consisted of pre-MUST equipment (tents). The next six hospitals that arrived brought their MUST equipment with them, but it was soon apparent that the MUST equipment would not work in Southwest Asia. Sand got in the turbines used to inflate the MUST shelters and made them unreliable. Furthermore, although MUST equipment was pretty good, it was a full generation behind the equipment used in the CONUS brick-and-mortar hospitals, and many of the health care providers had little training or experience on MUST assemblages. Either the personnel had to be trained on MUST or the hospitals needed to get newer equipment. The Army moved rapidly to refit as many hospitals as possible with DEPMEDS.⁶⁴

Enough DEPMEDS components were available in stocks to outfit 35 of the 44 hospitals deployed to the theater. To achieve the goal of 13,580 beds, however, it was necessary to collocate the remaining 9 hospitals—all RC units lacking satisfactory assemblages—with host nation hospitals.

The Saudi hospitals were well equipped with the latest equipment, such as CAT scanners and dialysis machines; they compared favorably with similar U.S. facilities and were better equipped than the Army's hospitals in many cases. Table 3 shows the U.S. hospitals sharing host nation hospital facilities.⁶⁵ All of these arrangements were in place except the use of the King Faisal Royal Hospital, which was set to go on the day that the ground war was started but never happened. Instead, the unit intended for this facility was split up and used to augment other hospitals.

Table 3. U.S. Hospital Sharing with Host Nation Hospitals

U.S. Unit	Host Nation Hospital
50th General Hospital	MODA Hospital, Riyadh
129th Evacuation Hospital	King Fahd Military Medical Complex, Dhahran
207th Evacuation Hospital	King Faisal Royal Hospital, Riyadh
217th Evacuation Hospital	MODA Hospital, KKMC
316th Station Hospital	King Fahd NG Hospital, Riyadh
382nd Field Hospital	King Fahd NG Hospital, Riyadh
251st Evacuation Hospital	Oman
311th Evacuation Hospital	United Arab Emirates - Abu Dhabi
365th Evacuation Hospital	United Arab Emirates - Dubai

⁶⁴ Colonel Tsoulos, 14 December 1992, and Department of Defense, "Medical Support," in *Conduct of the Persian Gulf War, Final Report to Congress*, April 1992. Hereinafter, *DoD Report to Congress*.

⁶⁵ Colonel Tsoulos, 14 December 1992.

Altogether these hospitals provided 4,100 hospital beds—about 30 percent of the Army beds in the theater.

In order to provide additional overflow capacity for casualty care, three hospitals were established outside of Saudi Arabia. Two evacuation hospitals were located in Abu Dhabi and Dubai respectively with no difficulty—but with no real workload either. The goal was 400 beds in Oman, but only 100 beds could be obtained, and the rest of this overflow capacity was obtained from an Air Force hospital there.⁶⁶

In these cases, the U.S. medical personnel shared the facilities with the Saudi medical personnel. The hospitals remained under Saudi control, and hospital commanders were informed that they were guests of the Saudis and in command of only their own U.S. troops. This arrangement was a source of some conflict, and one U.S. hospital commander was relieved and another warned because they did not accede to Saudi control.⁶⁷

The 382nd Field Hospital and the 316th Station Hospital were assigned to the King Fahd National Guard Hospital (KFNGH), Riyadh. The hospital is a 536-bed academic-tertiary care medical center serving the soldiers and families of the Saudi Arabian National Guard (SANG). It has about 3,500 employees. All its nurses are registered, and all of its physicians are board certified. KFNGH is managed by a joint venture of two Saudi Arabian hospital management companies, and U.S. Army medical officers from the Project Management Office for SANG Modernization were providing ongoing advice to this hospital and other SANG medical facilities. With the addition of a burn team from the U.S. Army Institute of Surgical Research and two neurosurgeons, KFNGH was designated to be one of the two burn centers and one of the three neurological centers for the theater. All of the U.S. Army personnel assigned to KFNGH were placed under the military control of the Commander of the 382nd Field Hospital, who reported to the 244th Medical Group.⁶⁸

Meetings between the KFNGH and the U.S. advisors to work out a memorandum of understanding (MOU) started in October 1990, about 3 months before the two units

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Lieutenant Colonel Bernard J. Horak, Ph.D., Colonel Richard J. Williams, M.D., and William H. Borton, M.H.A., "Preparations for War in a Saudi Arabian Host Nation Hospital," undated. Two of the authors were medical advisors to the SANG, and Mr. Borton was the administrator of KANG.

arrived on 17 January 1991. The final MOU was signed on 11 January 1991 by the Deputy Director of SANG and the ARCENT Commander. The MOU provided for the standards to be applied for accreditation and credentialing of physicians and other health care providers and specified that U.S. personnel would work under the Saudi chain of command in conformance with Saudi policies. KFNGH provided nearby housing for 80 U.S. on-call personnel, meals at the hospital, and considerable administrative support. Upon arrival U.S. personnel were briefed on the MOU, the mission, and Saudi Arabian customs. Each medical department also conducted a detailed discussion of its own operations. During the war, KFNGH treated 252 military patients, including 19 U.S. combat casualties—16 U.S., 1 UK, and 2 SANG. The patients were transported to Riyadh by C-130s and to KFNGH by air or ground ambulance. U.S. patients were cared for by both KFNGH and U.S. Army medical personnel.⁶⁹

While using host nation facilities compensated for a lack of U.S. equipment, the arrangement was not without problems. The agreements worked out to use the Saudi facilities had the effect of placing the U.S. health care providers under the direction of the Saudi professionals. U.S. health care providers were forced to sign contracts to work at the King Faisal Research Hospital, and they were required to wear civilian clothes at work.⁷⁰ Credentialing was also a problem, and some U.S. physicians allowed to practice in U.S. hospitals were not credentialed by the Saudis as consultant physicians. Other problems stemmed from the differences between U.S. and Saudi standards of care and hospital procedures. Since the Saudi professionals had been trained in Germany or the United Kingdom, they organized and operated their hospitals differently than the Americans. The great autonomy granted to hospital registrars under the British system used by the Saudi hospitals led to problems in admitting patients. In some cases, Saudi registrars refused to admit U.S. soldiers even upon the recommendation of a U.S. physician. There were other problems: Saudi physicians were less likely to prescribe narcotic pain killers than U.S. physicians; cardiopulmonary resuscitation was not allowed; and female officers and soldiers were not accorded equal treatment with their male counterparts. The Saudi nursing system allowed less technical independence to nurses for such tasks as drawing blood and starting IVs, and male nurses (a significant proportion of the total) were not allowed to care for female patients.⁷¹

⁶⁹ Ibid.

⁷⁰ Office of the Surgeon General, "After-Action Report for Operation Desert Shield/Storm Army Nursing Lessons Learned Conference, 9-10 July 1991," 23 August 1991.

⁷¹ Ibid.

Some problems occurred because of differences between U.S. and Saudi customs, and some behavior totally acceptable in U.S. hospitals was considered inappropriate in Saudi hospitals. Males and females eating lunch together, female nurses talking to male patients about non-medical matters, or ambulatory patients walking around and socializing was frowned on by the Saudis, and the U.S. chain of command had to deliver "stern reminders" to avoid placing the U.S. unit at risk of being asked to leave.⁷²

Some of the difficulties jeopardized the health of U.S. troops. Saudi hospitals refused in many cases to admit U.S. soldiers with non-combat-related illness. Female U.S. soldiers with gynecological problems were not considered "battle casualties" and were not allowed to be admitted. The 50th General Hospital at the MODA Hospital in Riyadh found that this made it difficult to provide reasonable outpatient and inpatient care for minimal care patients.⁷³ While sharing Saudi facilities compensated for the Army's lack of medical equipment by making more beds available quickly, some of those who shared Saudi facilities would not recommend the arrangement as a long-term solution.

Other Army medical personnel involved in this program, however, believe that it makes good sense to use existing facilities in areas where U.S. forces might be deployed on contingency missions. The experience of Operation Desert Storm indicates that planning for future use of host nation facilities should be done in peacetime with contracts and memorandums of agreement already in place with potential medical facilities so that integration of U.S. medical personnel into the facility goes smoothly when the time comes.⁷⁴

8. Personnel Service Support

External support was trivial to personnel service support

External support did not play a big role in the delivery of personnel service support (PSS), which includes personnel management, finance, postal, casualty and memorial affairs, personnel replacement operations, military chaplains, public affairs,

⁷² Horak, Williams, and Borton, op.cit.

⁷³ Colonel Donald Trunkey, M.D., After Action Report, 5 June 1991. Doctor Trunkey was Chief of Professional Services for the 50th General Hospital. The efforts of the 50th General Hospital to establish a holding company away from the Saudi hospital at Eskan Village were disapproved by the 244th Medical Group.

⁷⁴ Horak, Williams, and Borton, op.cit.

military history, the Judge Advocate General's Corps (lawyers), and bands.⁷⁵ These service functions were performed in the theater almost entirely by military units—either staff sections of headquarters or specialized units. Although these functions are important, they involve relatively few personnel. Only 5,239 of the Army's troops in Southwest Asia—less than 2 percent of the total troop strength in the theater—were assigned to PSS units. While these units did benefit from external support in the form of food, housing, communications, and transportation, they did not use external resources to perform their primary functions. The JAGC did perform a valuable service in the management of external support.

9. Transportation

External support was critical for the transportation function

Transportation was a major support function. Over 500 ships were discharged, 10,000 aircraft received, 12,000 tracked vehicles transported, and 117,000 wheeled vehicles, 1,800 helicopters, and 33,000 containers received and processed. About 374,000 personnel and 1.8 million tons of cargo, including 350,000 tons of ammunition, were received and moved onward.⁷⁶ All of these items were moved into Southwest Asia, and most of it was moved back out after the war was won.

An even more remarkable achievement was the overland move of XVIII Airborne Corps and VII Corps from their initial defensive positions in Eastern Saudi Arabia to their attack positions in the west starting in the early hours of 16 January 1991. While attention was focused on the air attacks against Iraq, thousands of trucks, tractor-trailers, and heavy equipment transporters of the divisions, corps support commands, and the 7th and 32nd Transportation Groups started moving in non-stop convoys along main supply route (MSR) Dodge hauling the troops, tanks, ammunition, fuel, rations, water, and other supplies of the combat corps into their positions for the ground war. Two army corps with 190,000 U.S. soldiers, 45,000 British and French troops, 95,000 trucks and other wheeled vehicles, 12,000 tanks or armored vehicles requiring heavy lift support, and large quantities of food, fuel, ammunition, parts, and other supplies were moved several

⁷⁵ John R. Brinkerhoff and Theodore S. Silva, *United States Army in Operation Desert Storm: Personnel Service Support*, Andrulis Research Corporation, 19 December 1995.

⁷⁶ "22nd Support Command Operation Desert Shield and Desert Storm Summary of Key Statistics," Information Paper, 4 November 1991.

hundreds of miles in 21 days and nights of intense activity.⁷⁷ In this move, 1,400 U.S. Army trucks and 2,100 host nation trucks drove over 35 million miles in 3,600 convoys. Heavy equipment transporters made 1,700 moves of tanks and low-boy trailers and 5,800 moves of other tracked vehicles.⁷⁸ VII Corps units moved more than 330 miles; XVIII Airborne Corps units, about 500 miles.⁷⁹ The magnitude and distances involved in this massive movement exceeded by far those in the movement of Third Army under General George S. Patton in the breakout from the Normandy beachhead in World War II—previously the epitome of rapid battlefield mobility.

The Army was unable to deploy enough of the right kinds of trucks, trailers, and auxiliary equipment in the theater to support the transportation needs of the theater and the maneuver of the forces. The Army deployed 56 percent of its TOE transportation units in the theater, including all of its heavy truck companies, 88 percent of its petroleum truck companies, 74 percent of its medium truck companies, half of its light and light-medium truck companies, half of its terminal units, a quarter of its watercraft units, and 81 percent of its movement control detachments.⁸⁰ Many of the rest of the transportation units were unavailable because they were engaged in supporting operations in CONUS or other theaters. The total number of Transportation Corps personnel in Southwest Asia was about 23,400, or just over 8 percent of the total strength of ARCENT.⁸¹ Of the total 255 transportation units deployed, 106 were Active component, 74 were National Guard, and 75 were Army Reserve.⁸²

The Army compensated for its shortage of TOE transportation units by making extensive use of external support.

- CENTCOM was able to use an excellent transportation infrastructure that has been constructed by Saudi Arabia and made available for U.S. operations without restrictions. Two major modern seaports and three major airfields were used. These facilities required no extensive construction or upgrading

77 Peter C. Langenus, "Moving An Army: Movement Control for Desert Storm," *Military Review*, September 1991, pp. 41-51.

78 "22nd Support Command Operation Desert Shield and Desert Storm Summary of Key Statistics," Information Paper, 4 November 1991.

79 William G. Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*, Harvard Business School Press, Boston, 1992, p. 146.

80 Lieutenant Colonel Daniel W. Kobasa, Major David E. Quimby, and First Lieutenant William E. Bardon, "Transportation Corps Units in Operation Desert Storm," *Transportation Corps Professional Bulletin*, July 1991, pp. 28 and 29.

81 DA, DAMO-OP, List of Army Units Deployed to SWA, 5 June 1992.

82 Kobasa, op. cit., p. 28.

before they could be used. Local management of these facilities was competent, and local contractors with experienced managers and skilled workers were available to perform the work necessary to load and unload the ships.

- Thousands of commercial vehicles were used to augment the military truck fleet.
- The Saudi Railway from Dammam to Riyadh hauled thousands of tons of munitions to the Al Kharj Air Base and supplies and equipment to Riyadh for transshipment by truck to units at KKMC and beyond.
- Thousands of civilian vehicles were rented to provide additional vehicles for headquarters and support units with inadequate vehicle allowances in their TOEs.

Table 4 shows the total number of transportation truck and terminal companies that were deployed to Southwest Asia and the major organizations to which they were assigned. About half of the transportation truck companies were allocated to the two corps support commands in roughly equal amounts, and the other half of the truck companies were allocated to the support command. At the support command level, the truck companies were assigned to three functional organizations, one for fuel distribution and two for hauling general cargo and equipment. About 40 percent of the truck companies were utilized for line-haul operations under the 7th and 32nd Transportation Groups.

Table 4. Allocation of Transportation Companies in SWA

	No. of Transportation Companies						
	XVIII Corps	VII Corps	Supcom ASGs	475th Group	7th Group	32nd Group	Total
Light Truck	1	1	1				3
Lt.-Medium Truck	9	3	1		6		19
Med. Truck Cargo	9	8	2	1	12	11	43
Med. Truck Petro	5	12		11			28
Heavy Truck	5	5				10*	20
Terminal					9		9
Watercraft	—	—	—	—	2	—	2
Total	29	29	4	12	29	21	124

* Five truck companies were converted to heavy truck companies using donated or commercial vehicles.

The top transportation officer in ARCENT was Colonel (Promotable) David Whaley. As a promotable colonel, he had the edge on other colonels, and he had the confidence of both General Pagonis and General Yeosock.⁸³ His official position was as the ACSTRANS, a staff officer in Headquarters, 22nd Supcom, and in mid-November 1990 he became Deputy Commanding General of the 22nd Supcom for Transportation—a position that gave him command authority as well as staff authority.⁸⁴ Colonel Whaley did the transportation planning for the theater and supervised the operations of the 7th and 32nd Transportation Groups. One of Colonel Whaley's greatest contributions to the war effort was his close relationship with Major Ali M. Al Shoaibi, the Director of the Jeddah Branch for Air Defense Projects, and the King's personal representative for transportation matters.⁸⁵ This close relationship bore fruit when it became necessary to press almost every available truck in Saudi Arabia into service to support the war effort.

a. Port Operations

External support was critical for port operations

Almost all of the U.S. and allied military personnel, equipment, and supplies entered Saudi Arabia through the seaports of Dammam and Al Jubayl and the airports of Dhahran, KKMC, and Riyadh. Some personnel and materiel also entered through two smaller Red Sea ports and through Bahrain and other airports and seaports along the Persian Gulf. Dammam and Al Jubayl had modern berthing and unloading facilities capable of handling several ships at a time. Most of the work in operating these ports was done by contractors under the Saudi Government in cooperation with U.S. Army transportation personnel. Existing Saudi Arabian authorities and systems HNS managed most of the air and sea traffic to and from the airports and seaports, with some U.S. military units also involved to handle the extra military workload.

The two major seaports at Dammam and Al Jubayl were the major points of entry for almost all of the equipment and supplies and some of the personnel for the Army, Marine Corps, and Air Force in Southwest Asia. The initial loads of military personnel arrived before the U.S. had its own support infrastructure in place. There was no choice but to round up external support in an impromptu manner to meet the immediate need.

⁸³ Colonel Whaley was "frocked" as a brigadier general in June 1991 and promoted to the grade on 1 January 1992.

⁸⁴ Colonel Whaley became DCG of 22nd Supcom for Operations and Transportation in the spring of 1991 after the departure of Major General Ken Guest, who had been DCG for operations.

⁸⁵ Interview with Major General David Whaley, 26 January 1994.

Later, it was necessary to use thousands of contractor personnel to operate the ports and unload and load equipment and supplies needed to sustain military operations. Major contracts were awarded for stevedoring services, port handling equipment, and renovation of oil worker barges to house U.S. offices and personnel. During the Redeployment Phase, the largest single contract awarded during the war was for port services.⁸⁶

The 7th Transportation Group Headquarters arrived starting on 10 August 1990, bringing with it a terminal battalion headquarters and elements of two terminal companies. A primary task was to establish an orderly process to receive and move onward the soldiers, sailors, Marines, and airmen arriving at Dhahran Airfield. It was necessary to move 8,000 Marines from Dhahran to their assembly area near the port of Al Jubayl and move 5,000 Army personnel every day to their unit assembly areas. There was no military transportation, and the 7th Group was forced to round up large numbers of local buses to move the passengers and their personal equipment. This was but the first of many instances in which hastily arranged external support had to be used to get the job done. Fortunately, there were many cars, trucks, buses, and drivers in Saudi Arabia available to support the Army.

At peak strength, the 7th Transportation Group had 9,200 soldiers, organized into 100 units, including 25 military truck companies and five provisional truck companies equipped with a variety of commercial vehicles, some operated by contractor personnel.⁸⁷ It included a converted air defense battalion task force whose personnel were retrained to accompany host nation and third country drivers and to drive a fleet of Czechoslovakian trucks furnished by the German Government.⁸⁸

The 551st Terminal Transfer Company, the first transportation company to arrive in Saudi Arabia, was assigned initially to operate an arrival/departure airfield control group at Dhahran Air Base to manage the reception and onward movement of troops—8,000 Marines had to be moved to their assembly area at Al Jubayl and over 5,000 soldiers arrived each day.⁸⁹ Later, the 551st moved to Dammam under the 24th Transportation Battalion Headquarters to supervise the storage and movement of the ammunition unloaded from three LASH vessels, each with 80 barges loaded with ammunition. Since the 24th Battalion did not yet have its terminal service companies in

⁸⁶ Bartlett, op. cit.

⁸⁷ Briefing, 7th Transportation Group (Terminal), "Operation Desert Shield/Storm," undated.

⁸⁸ Organization Chart, 7th Transportation Group, as of 7 January 1991.

⁸⁹ Colonel Daniel G. Brown, "Lifeline to the Front Line," *Transportation Corps Professional Bulletin*, July 1991, p. 2.

the theater, it contracted for laborers to discharge ammunition from the barges. This was difficult and frustrating, for many of the laborers did not speak English and did not appreciate the hazards of working with ammunition.

The 264th Terminal Service Company was a Type B unit, with only a small cadre of Active troops augmented by local civilian laborers. The 264th arrived in December 1990 and went to work unloading ships using local laborers.

The 417th Contract Supervision Detachment's TOE mission is to operate a small port using contractors to perform the work of unloading and loading the ships.⁹⁰ However, because the ports of Dammam and Al Jubayl proved to be adequate for the theater, this unit's personnel was used to form the transportation section of the 22nd Support Command Headquarters. Most of the detachment's personnel were trained to supervise contractors providing stevedores and other labor to do the work. One officer authorized to award contracts was put to work in the 22nd Supcom Contracting Office, where he worked for the duration of the campaign. Because of the extensive reliance on contracting for supplies and services, contracting officers who were authorized to let contracts were in heavy demand.⁹¹

The Flag Carrier Committee was organized in November 1990 by the 318th Movement Control Agency (MCA) to improve knowledge of incoming cargo. This committee coordinated the operations of the various commercial shipping lines that were sending vessels to Saudi Arabia. The committee consisted of officers from the 318th and 7th Group and representatives of the Sealand Corporation, Lykks, Farrell, and APL firms. The committee met twice a week to discuss ways to improve operations at the ports. The commercial firms were valuable in finding local assets, including trucks and drivers, to be used in speeding up port clearance to permit unloading of the vessels. One accomplishment was to obtain manifests for incoming ships to help determine the priority and appropriate equipment for unloading.⁹²

The Army has two types of terminal companies. The terminal service company has 357 personnel (over 300 stevedores) to load and unload ships using forklifts to handle 1,600 short tons of bulk cargo per day. The terminal transfer company has 238 personnel to move cargo and equipment from docks to marshaling areas in the port, using forklifts

⁹⁰ Telephone interview with Lieutenant Colonel Jonathan Kent, 19 January 1994.

⁹¹ The 417th had landed in Cairo because of a mistake in the routing of the aircraft and waited a week there until two small aircraft brought them to Saudi Arabia.

⁹² Interview with Colonel Peter Langenus, 20 December 1993.

and yard tractors to pull trailers. The Army had five terminal service companies and four terminal transfer companies in Southwest Asia, along with numerous detachments.

b. Railway Operations

External support was critical for railway operations

Substantial support was provided by the Saudi Railway Organization (SRO), which hauled munitions and other supplies from Dammam to the air base at Al Kharj and to Riyadh. The Saudi Arabia railway ran from Dammam to Dhahran and then to Riyadh, about 225 miles. The roadbed was in good condition; there was adequate rolling stock; and the management was excellent. One line was a high-speed direct line, and the other linked some intermediate stops, including the large air base at Al Kharj.

Army transportation planners paid no notice of these rail lines in the early phases of establishing the theater logistical system. They were motor transportation officers, and they focused on moving units and supplies up the Tapline Road near the Iraqi border. The Army's knowledge of rail transportation had vanished from the Active Army and resided solely in a few units of the Army Reserve. However, the 318th MCA, which arrived on 10 October 1990 to take over the theater movement control function, was an Army Reserve unit with some officers who had railroading experience in civil life. Upon arrival, the 318th had reviewed all ongoing transportation operations and had taken note that 500 tons of munitions were being hauled daily by truck from Dammam to the air base at Al Kharj, about 300 miles to the west. The trip to Al Kharj required inter-provincial clearances and Saudi military police escorts. Arranging the trips was a difficult process as well as a drain on truck assets that were needed elsewhere. The 318th thought that the railway could be useful in moving this ammunition.⁹³

On 15 October 1990, representatives of the 318th made contact with the SRO in Dammam to explore the possibility of using the railway for hauling cargo in support of the war. The Saudi authorities were enthusiastic and promised to make available whatever railroad resources were needed. The only limitation was that the trains could not operate on Thursday or Friday—the Saudi Sabbath.

On 9 December 1990, the first 50-car ammunition train was on its way to Al Kharj, and 36 hours later it was offloaded at Al Kharj. That one train saved the use of

⁹³ The basis for this section is Colonel Peter C. Langenus and Major Joseph A. Burro, "Railroad Movements in Support of Operation Desert Storm," *Transportation Corps Professional Bulletin*, January 1992, pp. 2-5.

135 medium trucks for 3 days. This first train was the result of a lot of planning, negotiation, and arranging with the Saudis plus a lot of effort to overcome skepticism within the Army.⁹⁴ These ammunition trains to the Air Force at Al Kharj continued throughout the war, saving many trucks for other missions.

As the plan for the ground campaign evolved, it became apparent that there were not enough trucks in Saudi Arabia to move all of the supplies over the distances contemplated in the great move of the two corps to the west. It was necessary to use the rail system to meet some of the demand. The 318th expanded its talks with the Saudi Railway Organization to include the feasibility of hauling freight all the way to Riyadh, to be offloaded there and then loaded on trucks for movement north to the attack positions.

A contract for using the railroad was in place on 10 October 1997, and on 17 December 1990 the first train left for Riyadh with 74 gondola cars, each carrying a 40-foot container. Ammunition trains ran throughout the fall of 1996, and from 17 December 1990 to 17 January 1991 a total of 13 special trains traveled from Dammam to Riyadh, carrying over 14,000 tons of supplies, including 22 complete hospitals.

After the start of the air war, the pace picked up, and two and sometimes three Army trains traveled to Riyadh each day to be met there by trucks to form convoys to move the cargo north toward Iraq. The urgency of the situation was such that on 24 and 25 January 1991, the Saudi authorities allowed for the first time trains to run on the Sabbath. On those two days, over 180 containers of medical supplies were moved. Overall, an additional 58 trains ran from Dammam to Riyadh during the air and ground wars.

As a result of the initiative of officers with railroad experience, a locally available asset that might otherwise have been left unused was put to good use.

The use of the Saudi Railway system allowed the Army to get by with 15 fewer medium truck companies. If the Army had been forced to operate the railway system without skilled local workers, at least one railway group headquarters and five railway operating battalions would have been needed to do the work (assuming the roadbed and rolling stock were in good condition). In effect, this valuable transportation asset could not have been used without the external support, for the Army's only two existing railway

⁹⁴ General Whaley admits that he was skeptical at the outset about the use of the railroad, and he gives full credit to the 318th MCA for persevering to bring the railway into use. Interview with Major General Whaley, 26 January 1994.

units were engaged in repairing sidings and operating trains at CONUS installations in support of mobilization, deployment, and resupply.

c. Heavy Equipment Transporters

External support was critical for heavy equipment transporters

The Army entered the war with an inadequate number of heavy equipment transporters (HETs). This shortage was overcome—barely—by ingenious marshaling of HNS HETs from a variety of external sources.

On the eve of the war, the Army had only 112 HETs and the Marines had 34, while the Iraqis had 3,000.⁹⁵ A U.S. heavy division with over 300 tanks had only 6 HETs. This occurred because the Army had planned to fight in Europe and use railroads to move tanks from ports to the front lines. Once the operation in Southwest Asia got underway, it became obvious that HETs would be needed to move heavy armored vehicles. Moving the vehicles on their own tracks would wear out the tracks on the vehicles and destroy the fragile roads in the area. The need for HETs in large numbers became crucial as CENTCOM planners devised a ground attack concept that involved moving two army corps long distances in a short time to execute the contemplated envelopment of the Iraqi forces.

The shortage of HETs was overcome by obtaining external support. Allies were prevailed upon to provide HETs; additional military and civilian HETs were purchased; and the sizable commercial HET fleet in Saudi Arabia (where the locals had learned to protect their few roads) was pressed into service. The HET fleet finally assembled is shown in Table 5.

The total number of HETs made available was adequate—but barely—for the job to be done. The slim numbers had to be completely effective, and this was achieved by putting all of the HETs under central control of the 32nd Transportation Group. The 32nd Group staff paid close attention to the HET assets to get maximum performance and ensure that the unit moves supported the maneuver plan for the ground war.

The 368th Motor Transport Battalion Headquarters commanded all five U.S. Army HET companies at EAC, with 120 HET tractors and trailers.

⁹⁵ Pagonis, op. cit., p. 203, citing numbers from GAO Report NSIAD 920-10.

Table 5. Sources of HETs

U.S. Military	497
U.S. Commercial	48
U.S. Trucking Ind	51
Commercial	333
Egypt	100
Italy	60
Germany	181
Czechoslovakia	40
Total	1,310

Source: DoD, *Conduct of the Persian Gulf War: Final Report to Congress*, April 1992, Appendix F, Table F-4.

The 1103rd Motor Transport Battalion had over 500 commercially leased, purchased, and contracted HETs operated by five medium truck companies that deployed without their own trucks.⁹⁶

The Egyptian HET battalion operated 100 tractors and trailers and did a magnificent job. In January 1991, this unit marched overland from Yenbo, a port on the Red Sea, to KKMC, and arrived in good shape. The Egyptians were "super troops" who did a good job. The Egyptian equipment was good—simple and capable. They took good care of their trucks, spending a lot of time on maintenance, and provided without fail 40 trucks daily for operational missions.⁹⁷ Repair parts and tires were provided to the Egyptian HET battalion by ARCENT contracts.

There were some problems with some the commercial HETs. To counter concerns that the local and third country national drivers would refuse to enter the forward areas once the air war started, a policy was established wherein civilian drivers would drive the HETs and a U.S. soldier would act as co-driver. The duties of the co-driver were to ensure that the HETs got to the proper destination and to take over the driving if the civilian drivers quit or refused to proceed. The use of U.S. troops as co-drivers required retraining 1,000 U.S. soldiers as HET drivers. The 32nd Group set up a training area at the pier area at Dammam and provided HET driver training around the clock to the personnel of the truck companies as they arrived from the U.S.⁹⁸ German

⁹⁶ 471st Transportation Company, "Unit Historical/Lessons Learned Report," 10 April 1991.

⁹⁷ Interview, Lieutenant Colonel Jack Stultz, 10 January 1994. Lieutenant Colonel Stultz was the executive officer of the 32nd TC Group during the war.

⁹⁸ Interview, Brigadier General Michael Gaw, 10 January 1994. General Gaw was commander, 32nd TC Group during the war.

chemical protective masks and gear were obtained by contract and issued to the local drivers to give them confidence that they could survive in the event of an Iraqi chemical attack.⁹⁹

Although the host nation contractors gave good support to the operation, dealing with the host nation and third country drivers required both patience and a willingness to stretch policy. At first, the host nation drivers were not allowed to use the convoy service centers, so they had to buy their own food and fuel. If they ran out of cash, they simply went back to the port without telling anyone. This caused a severe lack of control, so the policy was changed to allow all drivers to use the convoy service centers.¹⁰⁰

Soldiers accompanying the commercial drivers were instructed to stay with the truck no matter what happened. This policy was established to provide some kind of control, no matter how tenuous. The drivers tended not only to pray four times daily, but would stop and make tea at various times. The practice of lighting small fires to cook food or make tea at rest stops made the Americans nervous when these fires were close to trucks loaded with ammunition; thus, some measures were taken to keep the fires away from the ammo. Some U.S. soldiers preferred to do the driving themselves rather than ride as "shotgun" for the host nation or third country drivers.¹⁰¹

When the combat phase started, there were special concerns about the reliability of the host nation and third country drivers. The local drivers understandably were concerned about the possible effects of poison gas, and they wanted some protection against this threat. The situation came to a head on the night before the start of the ground campaign, when some drivers at Dammam wanted to leave their trucks. The 32nd Group Commander, Colonel Michael Gaw, had anticipated this problem and had arranged for armed guards to man the closed gates to prevent the drivers from leaving. Colonel Gaw went to the port to talk to the contractors. Those Saudis who owned their own vehicles could not be prevented legally from leaving, but the contractors agreed to having U.S. soldiers ride with their drivers. The U.S. co-drivers would each have two gas masks, one for issue to the local driver in case of attack. This arrangement settled the problem, and the host nation and third country drivers did the job once they were suitably protected.¹⁰²

⁹⁹ Bartlett, op. cit.

¹⁰⁰ 1103rd Motor Transport Battalion, After Action Report.

¹⁰¹ Ibid.

¹⁰² Gaw interview, 10 January 1994.

The use of external support for heavy equipment transporters allowed the Army to operate with 26 fewer heavy truck companies.

d. Local and Short-Haul Transportation

External support was critical for local and short-haul transportation

The Army lacked enough trucks to satisfy the demand for local and short-haul transportation, and this shortage was made up by external support. The Army had too few truck companies available to devote to local and short-haul missions. There were no car companies, no bus companies, and too few light and light-medium truck companies to satisfy the demands for moving passengers to and from the ports and air terminals, moving enemy prisoners of war, moving troops, and moving supplies from the log bases to the units.

Leased and donated vehicles are used to augment Army and other military units whose organic vehicle authorizations were simply too few for effective operations in the theater. Economy measures that had stripped units of "excess" vehicles proved to be a bad idea when it came time to operate in Southwest Asia. Units found it difficult to operate effectively over the long distances in the theater and to transport mail, supplies, and replacements from the logistical points. Headquarters did not have enough vehicles to allow the staff officers to travel to subordinate or lateral headquarters or accomplish face-to-face coordination, which is always desirable but was critical in Operation Desert Storm because of the poor communications available to support units at echelons above corps. This problem was solved in part by renting large numbers of four-wheel drive utility vehicles to provide a means of traveling along the MSRs. Trucks donated by the governments of Germany and Japan also helped to augment units and headquarters. The Government of Japan donated over 700 Toyota 4x4 trucks and Mitsubishi minivans, which were issued to CENTCOM, ARCENT, MARCENT, NAVCENT, AFCENT, ARSOF, and VXIII Airborne Corps. Other donated items included 96 forklifts, 75 water trucks, and 50 reefer vans.¹⁰³

¹⁰³ Headquarters, 22nd Support Command, Support Service Division, briefing slides, February 1991.

Table 6. Partial List of Equipment Donated by the Government of Germany

Vehicles		Other Items	
Heavy Equip Transporters	189	Rough Terrain Forklift	247
5 ton Cargo Truck	249	3 ton forklift	9
10 ton Cargo Truck	208	Tracked Bulldozer	25
Semi-trailer, 30k tons	129	Wheeled Bulldozer	20
Fuel Truck, 18-30k liters	60	Scoop Loader	48
Fuel Truck, 8-16k liters	123	Generators	325
Fuel truck, 1.8-5k liters	65	Hand Held Radio	2,000
Water truck	48	Canteens, 1 liter	18,000
Water Trailer, 5 liters	220	Water Cans	40,000
Reefer Trucks	111	Protective Masks	100,000
Reefer Trailers	255	Sandbags	500,000
Ambulance	107		
Command & Control Vehicle	35		
NBC Recon Vehicle	60		
VW 8 passenger van	120		
Maintenance Truck	48		

The Government of Germany donated a significant number of vehicles and other equipment as shown by the partial list in Table 6.¹⁰⁴ Some of these were used to augment unit vehicle authorizations; others were used to equip provisional transportation units. To give a better idea of the full extent of the equipment donated by the Government of Germany, some of the non-vehicular contributions are also shown. Some of the commercial vehicles obtained by lease or purchase or donation were formed into provisional units operated by local or third country drivers or American troops. Two examples of this are as follows:

- The KKMBC Bus Company and the KKMBC Truck Company were provisional units equipped with an odd assortment of locally supplied equipment—100 commercial buses and 71 cargo trucks. The vehicles were driven by converted infantrymen of the Berlin Brigade augmented by some NCOs from the 32nd Transportation Group. These two companies were kept busy moving incoming passengers and cargo from KKMBC airfield to their destinations, EPWs on their way to the rear, personnel moving in the local

¹⁰⁴ Headquarters, 22nd Support Command, After Action Report, "Total Amount of Gifts of Germany Equipment Shipped to SWA," 15 March 1991.

area, and finally troops going home. The Bus Company also operated a bus recovery operation to police the numerous buses that were abandoned along the MSRs.¹⁰⁵

- The Saudi Truck Battalion was formed in mid-February 1991 to operate over 400 Saudi flatbed and cargo trucks. This provisional battalion was used by the 32nd Group to lift bottled water, rations, ammunition and parts from Log Base Bravo to the forward log bases and to perform many smaller local haul missions.

e. Line-Haul Transportation

External support was critical for line-haul transportation

The heart of the motor transportation operation in Desert Storm was the line-haul operations conducted by the two Corps Support commands and by the 32nd and 7th Transportation Groups of the 22nd Support Command.¹⁰⁶ The Army used 43 medium truck companies for this mission, each equipped with 60 10-ton tractor-trailers and 120 20-ton trailers. These rigs carried light equipment, water in plastic tanks, and containers with all kinds of unit equipment and supplies, including ammunition.

Roads in Saudi Arabia were the most important and least developed transportation asset. Two primary main supply routes leading from the ports to the logistical support bases (log bases) were established to the northwest just south of the border with Kuwait and Iraq. The northern route ran north from Dammam/Dhahran to Al Jubayl and then northwesterly to the towns of Hafr Al Batin, Rafha, and beyond. This northern route was a modern four-lane highway for 85 miles (about Al Jubayl) and then a narrow two-lane road in poor condition for another 250 miles. Since this road ran along the trace of the old Trans-Arabian Pipeline, it was called the Tapline Road. The southern route ran westward from Dammam/Dhahran to Riyadh and then north to King Khalid Military City (KKMC) and an intersection with the Tapline Road just west of Hafr Al Batin. For the first 226 miles (to Riyadh) this was a modern four-lane road, and from Riyadh north it was a two-lane road with good shoulders for another 300 miles. The distance to the intersection of the two routes from Dammam was 334 miles by the northern route and

¹⁰⁵ Gaw interview, 10 January 1994. See also 32nd Transportation Group Command Report, 17 January 1991–1 April 1991.

¹⁰⁶ For use of external support in petroleum distribution, see section B.2, Fuel Supply.

528 miles by the southern route, but the time of travel by truck was about the same because of the differences in the road conditions.¹⁰⁷

The 3/2nd Air Defense Battalion Task Force was deployed in January 1991 from Fort Lewis, Washington, to Saudi Arabia without its Chapparral air defense weapons to provide additional heavy truck drivers.¹⁰⁸ The battalion's 400 personnel were augmented by individuals from other Fort Lewis units and the 73rd Engineer Company to bring it to a strength of 710 personnel upon deployment. The unit's mission was to provide 400 heavy equipment mobility medium truck (HEMMT) operators—a difficult task because no one in the battalion had ever driven a HEMMT. After 4 days of driver training by a team from The Transportation School, the battalion deployed with seven administrative vehicles, two pallets of unit equipment, and personal weapons and gear.

Upon arrival in theater, the battalion task force was assigned to support terminal operations at the port of Dammam while waiting for its HEMMTs to arrive. It also received 50 IRR personnel to bring it to a strength of about 730 personnel. A battery was issued eight Bradley Fighting Vehicles and used to augment port security. B Battery assisted in unloading ships.

On 2 February 1991, the battalion received 200 Czechoslovakian 10-ton TATRA trucks that had once been used by the East German Army and had now been donated by the unified German Government to assist the Coalition cause. The trucks were in poor condition, and 60 vehicles were so bad that they were of use only as a source of parts for the remaining 140 trucks. There was no maintenance support, and all of the manuals were in German. To get the TATRA's in shape, all maintenance personnel were consolidated into a battalion shop, and the mechanics set about teaching themselves how to get the trucks running and keep them running.

As the TATRA's became operational, they were divided between C Battery and the 73rd Engineer Company for driver training to familiarize the operators with the vehicles. On 5 February 1991, the first transportation mission was performed, hauling 2,000-pound bombs to King Fahd International Airport for the Air Force. As the mechanics and drivers gained experience with the TATRA's, the operational readiness

¹⁰⁷ Major Paul L. Willis, *Theater Linehaul Transportation Operations during Desert Shield and Desert Storm*, 22nd Supcom, undated.

¹⁰⁸ This section is based on Headquarters, 3rd Battalion, 2nd Air Defense Artillery Regiment, Memorandum for Headquarters 22nd SUPCOM, "Unit Historical/Lessons Learned Report," 12 April 1991, and the appended article by Major Ronald Sullenger entitled "Flexibility - Mission Essential in the 3-2 ADA Regt."

rate went up and the accident rate went down. Over 100 of the original 200 trucks were made operational, and the battalion hauled bombs, MLRS missiles, artillery shells, and propellant charges. Missions were driven as far as Log Base Echo, a 1000-mile, 3-day round trip from Dammam. During the ground war, the battalion delivered ammunition to the Marines during their assault into Kuwait.

The record of the battalion on its impromptu mission was excellent. Although there were accidents, there were no deaths or serious injuries among the drivers. The reorganized and retrained air defenders and engineers drove over a half million miles, carrying 1,000 loads of ammunition to combat forces in contact with the enemy; offloaded 27 ships; staged 10,000 pieces of military equipment; and put in 53,000 man-hours of effort securing the Port of Dammam. This effort demonstrated the flexibility and dedication of the troops of the 3/2nd Task Force and the value of being able to obtain from external sources equipment the Army does not have. If these trucks had not been made available, the Army would have had to provide two additional medium truck companies.

E. MANAGEMENT OF EXTERNAL SUPPORT

The use of external support requires planning, preparation, and management. Arrangements have to be made to obtain the support, plan its use, and oversee the work. In the Persian Gulf War, there was little planning and preparation for external support, and management was improvised. Support was obtained by commanders, staff officers, and energetic NCOs at all levels, but most of the work was done by contracting officers, civil affairs teams, and military lawyers.

The basic arrangements for external support were made at the highest levels. The ARCENT Commander, Lieutenant General John J. Yeosock, met weekly with his counterpart, Lieutenant General Khalid Bin Sultan, Saudi Arabian Armed Forces, to discuss support arrangements. The two commanders met with their respective staffs to discuss, plan, and arrange the way that U.S. Army soldiers would operate and the support that the Saudi Arabian Government would provide.¹⁰⁹ Major General Paul Schwarz, the Deputy Commander of Third Army at the start of the war, was used during the entire war as a liaison officer to the Saudi Arabian Ministry of Defense.

¹⁰⁹ Interview with Colonel Philip W. Carroll III, ARCENT Engineer, 29 November 1991.

1. Contingency Contracting

The key to obtaining external support in the Persian Gulf war was contingency contracting.¹¹⁰ Only two host nation support agreements—fuel and food—worked in the traditional manner, and both required a great deal of negotiation before they worked reasonably well. The rest of the external support was obtained by means of contingency contracting, and the process was not as smooth as might be implied by the impressive foregoing account of supplies purchased and services obtained.

Contingency contracting is the mechanism by which commanders can obtain supplies and services in a theater of operations. It differs from routine contracting in that the basic contracting process of solicitation of bids, bidding, examination of bids, and award and negotiation of a contract has to be expedited to meet the needs of the military forces engaged or about to be engaged in military operations. Some contracts for support, such as those omnibus contracts awarded for a wide range of support services in Haiti or Bosnia, can be negotiated in advance, but much external support has to be arranged quickly and urgently after specific needs are identified. For the Persian Gulf War, almost all of the external support was obtained by soliciting and awarding hundreds of small contracts.

Although the combatant commander has overall responsibility, service component commanders are directly responsible for logistical support of their forces in a theater of operations. In Southwest Asia, ARCENT was responsible not only for support of the Army forces but also for certain kinds of support for the Marine and Air Force as well.

ARCENT realized from the start that contracting would be important. One of the five members of General Pagonis' team of logisticians who accompanied him to Saudi Arabia on 7 August 1990 was a contracting specialist. However, neither CENTCOM nor ARCENT was prepared for the volume of contracting that had to be done. Rules designed to deter and limit fraud in peacetime did not work well in a combat theater. In the beginning, only Operations and Maintenance (O&M) funds could be used. Since the limit on purchases with these funds was \$15,000, it was necessary to lease items that would have been cheaper to purchase. The limit on construction contracts was \$200,000. These peacetime constraints made it hard to provide the services needed, and relief was

¹¹⁰ This section is based on the manuscript provided by Colonel Dan Bartlett cited previously.

obtained only after the problems in letting timely contracts were made known to Congress.¹¹¹

For the first 90 days of the war, during Operation Desert Shield, the Army logistical system in Southwest Asia relied extensively upon contingency contracting to support the military forces being marshaled in Saudi Arabia to defend against a continued Iraqi offensive. This improvised approach did not work well because it proved to be very difficult to transform the peacetime contracting system into a contingency contracting system, and there was no organized contracting infrastructure in the theater. There were too many procurement authorities operating more or less independently in the theater. Several CONUS organizations, including Army Material Command, Forces Command, Health Services Command, and the Corps of Engineers, were in the contracting business, each issuing contracting officer warrants. Each of these organizations had separate rules and procedures for providing contractor support. This caused great confusion.

Another problem was unfamiliarity with Saudi Arabia. At first, the contracting officers lacked knowledge of local markets and practices and had to accept whatever was offered and pay whatever was asked. In Saudi Arabia, because of this lack of familiarity with the local business culture and the threat of impending attack, local vendors perceived that they might not be paid, and they demanded immediate payment. This problem subsided as the credibility of the U.S. as a customer was established. Other local customs, such as a propensity for bargaining over prices, hours of business, and a different Sabbath, also had to be understood and taken into account.¹¹² Civil affairs personnel and area specialists were brought in to provide information on local customs and business practices.¹¹³ Prior knowledge of local business practices and what was available would have reduced the initial turmoil in locating adequate supplies at prevailing prices.

To get some control over theater-wide contracting, ARCENT asked the Department of the Army to establish a single Head of Contracting Authority (procurement authority) in the theater. The initial idea was that the Commander, ARCENT, would be the Head of Contracting Activity (HCA), and the Commander, 22nd Support Command, the Principal Assistant Responsible for Contracting (PARC). In recognition of the demanding role that the Commander, ARCENT, had as the ground

¹¹¹ Bartlett, op. cit.

¹¹² 18th Airborne Corps, Contracting After Action Report, 7 April 1991, cited in Bartlett.

¹¹³ Bartlett, op. cit.

forces commander, this was changed so that the Commander, 22nd Support Command, was the HCA, and the PARC was the commander of a newly formed contracting command. In effect, Headquarters, 22nd Support Command, would provide policy and oversight of contracting. Operations would be the responsibility of the ARCENT Contracting Command, which was established on 1 October 1997 at Dhahran Air Base under Colonel Dan Bartlett. The contracting command grew to a strength of 65 personnel and had branch offices at Riyadh, King Khalid Military City, and, after the cease-fire, Kuwait City.¹¹⁴

A procurement chain of command was established and enforced. Contracting was done entirely by contracting officers at ARCENT, 22nd Support Command, and XVIII Airborne Corps. Other units were able to obtain contract services and purchase supplies locally by means of blanket purchasing agreements and the appointment of field ordering officers. The system worked generally as follows:

- The ARCENT Contracting Office awarded all contracts amounting to \$1 million or more.
- The XVIII Airborne Corps Contracting Office or the ARCENT Contracting Command of 22nd Support Command awarded contracts less than \$1 million but equal to or exceeding \$100,000. These two contracting offices also awarded all contracts using simplified purchasing procedures.
- Blanket purchase agreements (BPA) were also used, particularly for local purchase of repair parts. A BPA is an umbrella contract with a vendor that allows units to fill anticipated repetitive needs for a particular kind of supplies or services using simplified purchase procedures. Generally, BPAs were awarded to several vendors for each kind of supply or service. BPAs could be used not only by contracting officers, but also by unit personnel designated as call officers. Unit call officers had a limit of \$2,500 for each BPA purchase from a vendor. BPAs were established for such items as gravel, tires, medical supplies, packaged POL products, and office supplies. At the peak of operations, there were 900 call officers authorized to use BPAs, and these made 43,000 purchases aggregating to about \$32 million.
- For small purchases, units of battalion or larger size were allowed to have field ordering officers, who could make purchases of local goods up to \$2,500 in value. Field ordering officers bought supplies for unit use and were not involved in leasing accommodations, renting vehicles, or buying television sets.

¹¹⁴ 22nd Support Command, "Contracting plays vital role in Gulf war victory," *Logger News*, 17 July 1991.

All contracting was done in accordance with the Federal Acquisition Regulations (FAR). These regulations established procedures by which competition could be encouraged and corruption discouraged. Each procurement had to have a certified fund cite approved by a finance officer and had to be awarded by a contracting officer. Contract disputes settled for up to \$25,000 were approved by the PARC at 22nd Support Command; settlements over that amount, by the HCA. Of the over 100,00 contracts awarded during the operation, fewer than 50 were illegal procurements.

The contractors found that the U.S. was a fair and reasonable client. The U.S. did not take kickbacks. The contractors were paid progress payments every 2 weeks and paid invoices promptly after they were submitted. These practices were different from the local system in which influence affected the award of contracts, payment was slow, and terms were subject to tedious renegotiation.

Contracting in this manner developed a competitive market, and prices dropped dramatically once the system caught on. The rental fee for a refrigerated van dropped from \$1,000 per day to \$100 per day with maintenance included. Rental fees for administrative vehicles went from \$100 per day to \$15 per day. There are numerous other examples of how proper contracting reduced the costs of goods and services.

Contingency contracting was essential for obtaining the external support that made Operation Desert Storm possible. Yet, in this area as in other aspects of external support, preparation was inadequate and arrangements were improvised. Some of the lessons learned from this experience are as follows:

- The United States Government should not rely on another nation, even a host nation, to provide contracting support to U.S. forces. If a foreign government volunteers or is asked by the United States Government to provide financial support, the U.S. should do the contracting and request reimbursement from the donor governments. Such donated funds would go into the General Fund and could then be re-appropriated to the Military Services to pay for the costs of the contracts. This was the method used by Saudi Arabia and Kuwait to reimburse the United States for expenses incurred in the Persian Gulf War.
- Logistical preparation of the battlefield should include a market survey of what is available in a region, how it is distributed for sale, and the prevailing prices charged to preferred customers. These market surveys can be carried out by host nation support staff members and civil affairs personnel, assisted by U.S. embassy personnel in the respective countries.

- The contingency contracting organization for a theater of operations needs to be operational at or before the start of military operations. The PARC needs to be among the very first units arriving in a theater of operations.
- Finally, there is a general lack of understanding of the principles and rules of contracting from the company to the corps level. Most officers and senior NCOs, who wanted to obtain the external support, did not know how to establish requirements, define minimum specifications, and write a statement of work. Contracting tends to be the province of a few specialists who pursue their business in an orderly, leisurely manner, and this may be acceptable in peacetime. In the hectic atmosphere of preparing a theater of operations for war, contracts had to be awarded quickly, and contracting turned out to be everyone's business.

Despite the success of contracting, CENTCOM decided in early November 1990 to get away from contracting and rely entirely on traditional host nation support. After weeks of negotiations among CENTCOM, the Department of State, and the Saudi Arabian Government, it was agreed that the Kingdom of Saudi Arabia would manage a host nation support program designed to provide food, fuel, water, transportation, accommodations, and other supplies and services to the U.S. force free of charge. The Kingdom of Saudi Arabia would also assume responsibility for all existing U.S. contracts. Brigadier General Pat M. Stephens was appointed Deputy Director for Host Nation Support in CENTCOM Headquarters to oversee the new program.

There were major problems with this arrangement from the start. Saudi Arabia did not have in place a contracting infrastructure that could provide responsive and responsible support. Nor did the Saudi Arabian officials share the U.S. sense of urgency. Saudi failure to pay contractors in a timely manner affected contractor support adversely. Finally, the Saudi Arabian Government had a tendency to question support requirements and renegotiate them after the requirements had been approved through U.S. logistic and command channels. All of these factors worked to make the host nation support program unworkable.

Almost immediately after the initiation of the host nation support program, CENTCOM and the service component commanders in Southwest Asia recognized they could not rely on Saudi Arabia to provide external support in a wartime environment. The Army returned to its earlier practice and continued to let contracts directly for goods and services. Starting about 1 April 1997, during the redeployment phase, some U.S. contracts were transferred to the Saudi Government.

2. Civil Affairs

Civil Affairs (CA) units originated in the U.S. Army during World War II to meet the need for military specialists to administer areas liberated from German and Japanese occupation and govern areas in Germany and Japan occupied by the U.S. Army during and after the war. Numerous enthusiastic personnel with appropriate education and training were formed into military government units to assure law and order and provide essential services to the populations of territories administered by the U.S. Army. After World War II, the probability that the U.S. would occupy and administer large areas of foreign nations appeared remote and, by the early 1960s, almost all of the Army's Civil Affairs capability was in the Army Reserve. During the Vietnam War, the Army increased its active Civil Affairs capability and stationed Civil Affairs units in Vietnam to assist in counter-insurgency operations.¹¹⁵

After the Vietnam War, emphasis within DoD and the Army turned to creating a credible capability for waging conventional war with the Soviet Union in Europe as part of NATO. One aspect of this NATO program was to maximize the U.S. contribution to NATO combat capability by obtaining logistical support from local resources in Europe provided either by other NATO nations or by local contractors under the general name of wartime host nation support. It soon became apparent that there was a requirement for some specially trained personnel to manage wartime host nation support. The skills and orientation of the Civil Affairs units matched the requirements of this job closely, and many CA units were oriented to providing liaison and coordination of host nation support in Europe.¹¹⁶

At the start of the Persian Gulf War, the Third U.S. Army staff was not enthusiastic about CA. There was no real sense of what CA could do for the organization. The major role of CA in Europe was host nation support, but in Third U.S. Army planning, this job was assumed by the logisticians and contracting specialists. This made it difficult to find a useful role for CA in operations in the Middle East. Other CA activities such as civic action and humanitarian assistance were not popular among the nations of the CENTCOM region, which considered themselves above "taking charity." There appeared to be no opportunities for civil administration of occupied territory, and

¹¹⁵ Group interview, HQ, U.S. Army Civil Affairs and Psychological Operations Command, 3 July 1991. The group included Brigadier General Joseph C. Hurteau, Commander; Colonel John W. Geiger, Resource Management Officer; Command Sergeant Major and Stephen M. Foust.

¹¹⁶ In Europe, the term "civil military cooperation" (CIMIC) is used along with HNS to describe the arrangements for mutual support between the U.S. armed forces and local authorities.

dealing with dislocated civilians or refugees was not considered likely. In short, it was hard to find something that CA could do for Third U.S. Army.

When the war started, the initial view at ARCENT was that there would be little need for CA capability. The thrust of Operation Desert Shield was to defend Saudi Arabia against an Iraqi invasion. The defensive mission did not envisage operations in populated areas. Indeed, U.S. units were situated deliberately in unpopulated or sparsely populated areas. The defense mission did not envision preparing to administer occupied territory in Iraq or even liberated territory in Kuwait. ARCENT thought that CA units were not needed to manage HNS in Saudi Arabia because the Saudis had great experience in contracting for services and needed no help in doing this.¹¹⁷ It was believed that the 96th CA Battalion alone could coordinate the provision of Saudi support to the U.S. forces.

Tactical CA teams at Corps and division usually operated in teams of two to three personnel and performed a wide variety of tasks, including the following:

- Coordinated with local Saudi Officials, including the local emir, the Red Crescent, and the Civil Defense Office.
- Located potential sources of water: wells, plants, and lakes. Arranged for obtaining water from a local water plant producing 500,000 gallons per day. One team persuaded a local farmer not to evict U.S. Army units drawing water from his well and other farmers to permit U.S. forces to use their wells.
- Assisted in the EPW mission by interviewing prisoners, exposing Iraqi soldiers posing as civilians, and processing prisoners for turnover to the MPs. One CA team persuaded 23 Iraqi soldiers to surrender.
- Processed dislocated civilians. CA teams gave food, water, and fuel to civilians to minimize their interference with U.S. military operations and warned them to avoid the main supply routes and not to interfere with convoys. One CA team found 15 gallons of fuel for a civilian after his fuel had been confiscated by U.S. troops and threw in a case of MREs for good measure.
- Arranged for local support. CA teams located local food and other supplies for dislocated civilian holding areas, arranged for repair of leased trucks by local mechanics, and worked out problems with local host nation support agreements.

¹¹⁷ Interview, Colonel James C Kerr, ARCENT G-5, 28 June 1991.

- Made area surveys. Studied the terrain and the local economy, people, culture, and resources. Advised commanders on how to accommodate to local culture. Advised on search procedures for Iraqi women. Advised on looking out for Iraqi antiquities.
- Surveyed local facilities for U.S. use. Assessed damage to the facilities. Found hot mix asphalt plant (partially usable), housing areas (unusable), construction equipment (some usable). Looked for a refrigerator truck to haul blood supplies but was unable to find one.
- Assisted medical units to provide medical care for dislocated civilians and prisoners; provided interpreter services in some cases; helped maintain family integrity.
- Inspected food and tested local water for quality.
- Located abandoned U.S. equipment and supplies.
- Located enemy supplies, such as ammunition, food, bottled water, tents, and farm equipment. One CA team found a large food storage warehouse with grain, inventoried the contents, and distributed the food to local Bedouins.

Headquarters, 22nd Support Command, was heavily involved in the management of external support in ARCENT. Several CA units were devoted to HNS management. Company C of the 96th CA Battalion functioned in support of the 22nd Support Command initially and assisted in establishing host nation support arrangements and management of external support during the initial defense and build-up phases.

The 304th CA Group arrived in January 1991 and was assigned to the 22nd Support Command to perform a variety of functions, including host nation support management.¹¹⁸ The 304th provided staff support to Headquarters, 22nd SUPCOM, and its subordinate commands. Liaison teams were provided to the three area support groups (ASGs) of the SUPCOM. Liaison was effected with the Kuwait Task Force, the Combined Civil Affairs Task Force, and the American Consulate in Dhahran. The 304th Group assumed from the 96th CA Battalion responsibility for evacuating over 1,000 U.S. civilians. Training on Middle East culture was provided for replacements, and cultural issues pertaining to burial and provision of religious materials to prisoners were resolved. After the liberation of Kuwait, the 304th provided support to the restoration effort there, including procedures for moving vehicles into Kuwait and for providing equipment and services to the forces there.

¹¹⁸ The section on the 304th CA Group is based on the Group's after action reports transmitted to HQ USACAPOC by memorandum, 18 May 1991.

The primary mission of the 304th CA Group, however, was managing external (host nation) support. The Assistant Chief of Staff, Host Nation Activities (ACSHNA), of the 22nd SUPCOM had overall responsibility for this important activity. About half of the 304th was assigned to support the ACSHNA. The 304th established day-to-day working relationships with Saudi officials at the Ministry of Defense and Aviation. The work consisted of working out arrangements for facilities, vendors, and government-to-government relations. Arrangements were made for laundry, shower, and mail facilities, ramp space for C-23 aircraft and Apache helicopters, warehouses for medical supplies and enemy weapons, maintenance space for the French air force, and many other uses. Lists of vendors for local purchase were made and compared with requirements. Inter-governmental issues, such as off-limits areas, facilities, and services at Khobar Towers, a large billeting facility for U.S. troops, were worked out. In addition, the 304th prepared plans and reports for the 22nd SUPCOM on contracting and other forms of external support.

After the victory, the U.S. forces began the task of redeploying to CONUS and Europe. External support would become even more important to support the movement of the units out of Saudi Arabia. ACSHNA and the 304th CA Group worked hard during March and April 1991 to facilitate the redeployment. New requirements for storage sites for captured Iraqi equipment, for recreational facilities, for disposal sites, for cleaning U.S. equipment, and for staging areas for the ports were met. Issues on maintenance of U.S. constructed roads and Saudi-donated facilities were resolved. Support for the restoration of Kuwait continued. Finally, on 10 May 1991, the 304th CA Unit redeployed to CONUS.¹¹⁹

3. Judge Advocate General's Corps

The Persian Gulf War has been characterized by one Army lawyer as "the most legalistic war we've ever fought."¹²⁰ However, the extent and type of legal workload was different from that which had been anticipated. Based on experience in previous wars, the JAGC planners had sized and shaped their force structure to handle a heavy military justice workload, but the troops were well behaved, and the heavy workload turned out to

119 304th CA Group, AFKA-ACDM-E, "Command Report, Operation Desert Storm," Memorandum for Commanding General, 22nd Support Command, 15 April 1991.

120 Brinkerhoff and Silva, *Personnel Service Support*, op.cit., Chapter 9, "JAGC Operations."

be contract administration.¹²¹ The 270 lawyers in Southwest Asia were kept busy doing a variety of things, including the following:

- Operational law dealing with the rules of engagement, law of war, treatment of EPWs, and dealing with civilians in the area of operations.
- Criminal Law dealing with violations of the Uniform Code of Military Justice (UCMJ) by military members.
- Legal Assistance to military members by preparing wills, powers of attorney, assisting with financial problems, and other personnel legal matters.
- Administrative Law by interpreting the laws and rules and regulations that govern Army operations and administration and conducting investigations into alleged infractions of the rules.
- Labor and Unemployment Law concerning relationships between the Army and civilian employees and contractors, enforcement of applicable sections of the U.S. Code, and dealing with offenses committed by civilians and contractors not subject to UCMJ.
- Environmental Law dealing with the legal aspects of federal and local laws regulating the Army's interaction with the environment.
- Claims to include processing and adjudicating claims against the U.S. Government.
- Contract Law dealing with the legal sufficiency and enforcement of business relationships between the Army and the many suppliers, vendors, and contractors used by the Army to do some of its work. This functional area was particularly important in the Persian Gulf War because of the large amount of support provided in Southwest Asia by U.S., host nation, and third country contractors.

Staff Judge Advocates (SJAs) and contracting officers at ARCENT and SUPCOM were worth their weight in gold. The contracting environment was fast and furious and broke new ground. The Army was trying to obtain vast amounts of supplies and services from locals and third country nationals by means of contracts to supplement resources available through the Army logistical system. The rules were not clear, but one thing was certain—the law had to be obeyed. Providing legal opinions on these contracts required experience and expertise in a legal field that had not been a major effort of the JAG Corps prior to the war. The Active component lawyers of the Contract Law Branch of the office of the JAG for 22nd SUPCOM were acquisition attorneys, and additional expertise came

121 Ibid.

from three Reserve component attorneys, each of whom had extensive experience in government contract law.

Attorneys and contracting officers worked together. Legal reviews often were accomplished the same day the contracts were signed. During the initial defense and build-up phases, emphasis was on educating contracting officers on legal guidelines for writing contracts in a contingency contracting environment. As the attack phase began, emphasis shifted to letting many small contracts quickly. During the redeployment phase, the emphasis was on awarding large and complicated service contracts, terminating earlier contracts, and working on contract-related claims. Most existing contracting laws and regulations were adaptable to contingency contracting. However, contracting in Southwest Asia was complicated by a shortage of procurement funds, causing many urgent needs to be obtained by more costly leases and by restrictive rules for construction that, in some cases, required lengthy waiting periods and prior consultation with Congress.

F. CONCLUSIONS

External support was critical to the success of Operation Desert Storm. Although it was largely unplanned and unanticipated, it was brought to bear quickly and allowed the Army to deploy many fewer support units than would have been required to achieve the same results.

1. Applications of External Support

As recounted in some detail above, external support was used widely for items large and small. It was applied across the board, and it was used purposefully to provide most of the support for some specific logistical operations:

- When the first U.S. Army combat troops arrived, they lacked the support units that—according to Army doctrine—were needed to enable and sustain their operations. This lack had to be made up by external support. Most of the actions of the few logistical personnel in Saudi Arabia during Operation Desert Shield were concerned with lining up host nation support and letting emergency contracts. Later, when Army support units did arrive, they were pressed into service to support the two corps and were not used to replace existing exterior support arrangements.
- When the VII Corps arrived in Southwest Asia from Germany, external support was essential for the debarkation, reception, and onward movement

of the troop units. Food, latrines, trucks and buses, and temporary housing were supplied by local contractors.¹²²

- External support was critical for the enemy prisoner of war mission, which the Army had overlooked in planning its logistical operations in Southwest Asia.
- After the cease fire ended combat, the mission of restoring Kuwait was supported by the Government of Kuwait with real estate, water sources, access to infrastructure and utilities, and, above all, funds.¹²³ The Government of Kuwait paid over \$70 million in fiscal years 1990 and 1991 in support of U.S. Army restoration operations.¹²⁴ Arab forces were tasked to restore civil order.
- Redeployment was heavily supported by external support. Major contracts were awarded from August 1991 to March 1992 and beyond for cleaning of equipment to pass U.S. Customs inspections; cleaning, folding, and packing of tents; repair of Khobar Towers, clearing of troop compounds; dismantling temporary structures; provision of port services; retrograde movement of ammunition; provision of flat bed trucks; and maintenance.¹²⁵

2. Characteristics of External Support

Although armies have always relied on external support to complement and supplement their own support systems, military leaders seem always to profess a desire to own the support necessary for waging military operations. This reflects the reality that, while external support is useful—even essential, there are limitations to its utility.

The major advantages of some of the various forms of external support are as follows:

- External support can incur lower peacetime costs than would be incurred by relying on military units if external support provides the same level and quality of support at a lower cost—an issue that has to be resolved independently in each case.
- External support does not incur full peacetime costs if it is called on only when needed only during wartime. Prime examples include contractors hired

¹²² Headquarters, VII Corps, Lessons Learned: "Reception of Soldiers (Billeting, Life Support, and Services): Host Nation Support," 10 May 1991.

¹²³ Headquarters, 22nd Support Command, "Restoration of Kuwait," Briefing Slides, 16 February 1991.

¹²⁴ Headquarters, 22nd Support Command, "FY91 Expenses of Kuwait," and "Kuwait Cost FY 92," Briefing Slides, 27 October 1991.

¹²⁵ Headquarters, 22nd Support Command, "ARCENT Contracting Command, Redployment Contracts," Briefing Slide, 27 October 1991.

and equipment leased during the mobilization and deployment phase. Other examples include facilities and equipment brought into action upon mobilization as a result of preplanned actions or newly identified needs.

- External support does not have to be moved to the theater of operations. Resources, equipment, and personnel already in the theater are in position to help quickly with little transportation cost.
- Existing external support can be ready quickly without lengthy construction or marshaling of resources. Basic facilities and services, such as ports, airfields, and roads, take a long time and a lot of effort to build, and it is better to be able to use the existing infrastructure than to build a new one.
- External support allows economies in the use of trained military personnel. Substitution of civilian employees, host nation nationals, and allied and third country nationals releases military personnel for combat and combat-related tasks. Since military personnel are expensive, limited in supply, and needed for things only they can do, this conserves overall combat potential.
- External support provides skills and equipment not found in military forces. It is costly to provide military units to cover every possible need for military operations. It is better in some cases to plan to rely on external support for capability that can be provided by non-military personnel and that would be a very low density, high cost endeavor for the military services.

There are limitations to the use of external support that must be considered in making plans to use external support in lieu of U.S. military forces.

- Special provisions must be made to assure the reliability of external support. Military units are trained and indoctrinated to operate on the battlefield. Civilian organizations may also require special training and equipment. In the absence of special efforts, non-military personnel may lack the will to remain in harms way. For example, while we have found no major problems with civilian wartime reliability, there are reports that some contractor personnel left the combat area when the air war started and had to be persuaded to return. Some truck drivers refused to drive into the forward areas until they were provided gas masks. Future plans to use external support should include provisions to ensure its reliability.
- External support may not be reasonably available in sufficient kind or amount in some potential theaters of operations. In these cases, it would be prudent to provide a military support capability to ensure that the necessary skills and equipment can be made available if needed.

3. Impact of External Support in the War

The degree of dependence on external support during the Persian Gulf War varied according to the class of support or service function. Table 7 shows the external support functions included in three categories of dependence.

Table 7. Relative Dependence on External Support by Function

Functions for which External Support was **CRITICAL**

Water Supply
Tentage Supply
Petroleum Supply
Ammunition Supply
Repair Parts Supply
Port Operations
Railway Operations
Heavy Equipment Transporters
Local and Short Haul Transportation
Line Haul Transportation
Construction
Barrier Materials Supply
Construction Materials Supply
Enemy Prisoner of War Operations
Wheeled Vehicle Supply
Minor Equipment Items
Maintenance

Functions for which External Support was **USEFUL**

Food Supply
Sundries Supply
Field Services
Medical Services
Medical Supply

Functions for which External Support was **TRIVIAL**

Air Delivery Operations
Individual Clothing and Equipment Supply
Combat Vehicle Supply
Personnel Service Support
 Personnel Operations
 Finance
 Postal Service
 Mortuary and Casualty Affairs
 Personnel Replacement System
 Chaplains
 Judge Advocate General's Corps
 Public Affairs
 Bands

In categories for which external support was a major source of supplies or services, it is considered to have been *critical* to the success of the operation. In categories for which external support was a substantial contributor but was not absolutely necessary, it is considered to have been *useful* to the success of the operation. In categories for which external support provided either small amounts of supplies or

services or none at all, it is considered to have been *trivial* to the success of the operation. As it turns out, there were only a few functions for which external support was trivial, and these were mostly those concerned with administration of U.S. military personnel. For most functions, external support was critical—meaning that the Army could not have done the mission without it.

Food supply requires a comment. The Army used its own rations for 84 percent of the meals and had enough rations on hand to feed all of the meals. However, the contribution of fresh food from contractors was more important than its 14 percent of the meals consumed indicates. From a morale viewpoint, therefore, it is possible to conclude that external support was indeed critical to this function also.

Table 8 shows the numbers of selected types of Army support units that were actually deployed to Southwest Asia and a rough estimate of the additional unit equivalents that were provided by external support. If these estimates are regarded as a cost-avoidance, they make up billions of dollars of savings to the United States. If these estimates are regarded as statements of need, it is clear that a lot more support was needed than was available in the Total Army.

4. A Lesson to Be Learned

The experience of the Persian Gulf War indicates that the United States did not do a good job of estimating what it would take to wage a major regional war in Southwest Asia, failed to plan adequately on how to obtain external support, and lucked out because of a good existing infrastructure, adequate local supplies of vehicles, water, and fuel, and the good will of the Kingdom of Saudi Arabia and other Coalition partners. This is an important lesson for waging major theater wars in the future.

We do not intend to fight alone. We will fight, if we can, in a coalition of allied nations, whom we expect to contribute combat and support forces and external resources to the common effort. The United States does not contemplate projecting its troops into a hostile territory in which the troops would be denied beneficial use of the existing infrastructure and of resources from the countryside. We plan to be fighting to assist a friendly nation or nations, from which we expect to receive access, support, and cooperation.

Table 8. Support Units and External Support Equivalents in Southwest Asia

Unit Type	Army	External
Engineer Heavy Combat Battalions	7	-
Engineer Construction Battalions	-	12
Supply & Service DS Companies	22	-
Field Services GS Companies	8	8
GS Supply Companies	18	10
Petroleum Companies	19	20
Petroleum Truck Companies	29	32
Ammunition Companies	16	-
Water Supply Companies	5	5
Water Detachments	7	7
Water Teams	21	21
Air Drop Companies/Detachments	6	-
Terminal/Cargo Companies	14	20
Railway Battalions	-	5
Cargo Truck Companies	83	80
Heavy Truck Companies	21*	26
Trans Detachments	30	-
Movement Control Detachments	69	-
Maintenance DS Companies	47	25
Maintenance GS Companies	19	12
Maintenance Detachments	30	-
Explosive Ordnance Detachments	23	-
Total Support Units	494	283

* Includes 5 light-medium truck companies deployed without vehicles to operate commercial heavy equipment transporters.

Thus, when plans are made to wage a major theater war in accordance with the current national strategy, it makes sense to consider, quantify, and count on all of the sources of external support discussed in this paper. It does not make sense to underestimate support requirements and underfund support resources, relying yet again on improvisation and good fortune to make up the difference. The Joint Staff and the combatant CINCs should perform as a routine planning action the logistical preparation of the battlefield, taking into account the totality of external support available in a prospective theater of operations. The modern version of living off the countryside is a way to save on peacetime defense costs and maximize the combat potential that can be delivered in wartime by our military forces. This can be an important lesson from the Persian Gulf War.

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